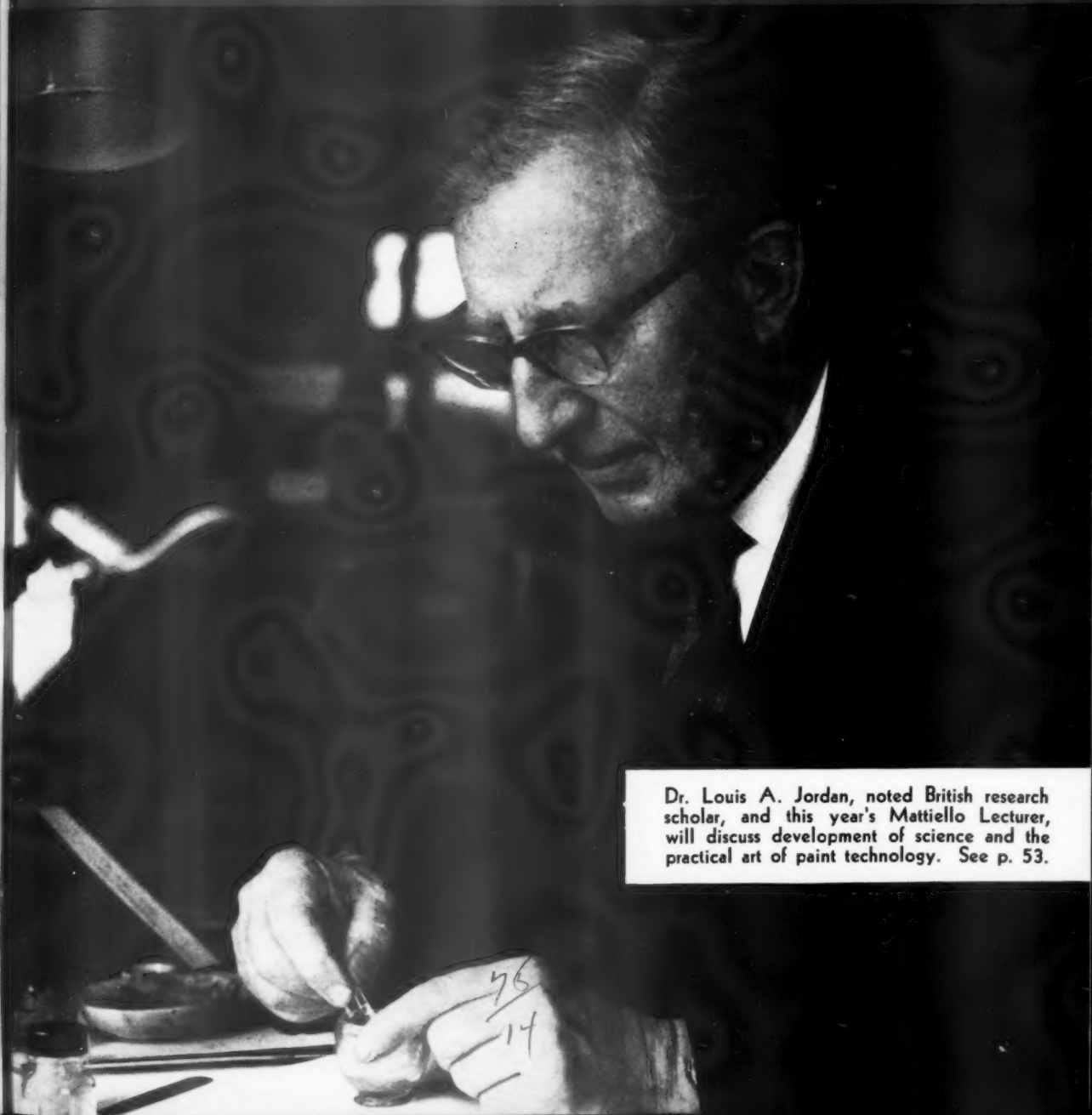


PVP

JUNE
1961

PAINT and VARNISH
PRODUCTION

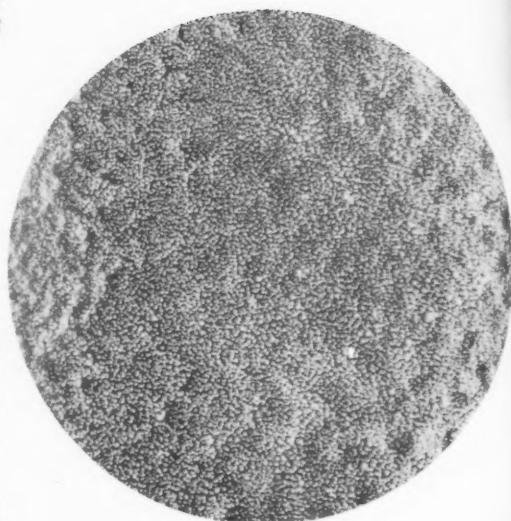
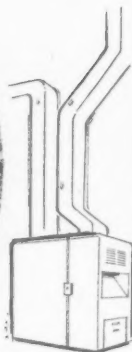


Dr. Louis A. Jordan, noted British research scholar, and this year's Mattiello Lecturer, will discuss development of science and the practical art of paint technology. See p. 53.



This finish contains
quality controlled

Plaskon Coating Resin



This finish contains
ordinary coating resin

Compare these two unretouched photographs of hammer tone finishes on "24 gauge" steel panels. Notice the more uniform pattern and freedom from mottling in the finish on the left. It is made with quality controlled Plaskon Coating Resin. Poor quality raw materials can cause the blotchy, irregular appearance so obvious in the right hand panel.

Quality control checks are run on Plaskon Coating Resins throughout their manufacture . . . from selection of raw materials to finished resins. True . . . this extra care and attention costs a little more . . . but measured in terms of customers' satisfaction it is a shrewd investment. More details? Drop us a line.

PLASTICS DIVISION

40 RECTOR STREET, NEW YORK 6, N. Y.



BASIC TO AMERICA'S PROGRESS



Above, a typical solvent manifold. Shell now offers five high boilers and 11 other solvents in economical mixed loads.

SOLVENTS:

Shell Chemical now offers 5 high boilers, 2 medium boilers, 2 low boilers, 4 latent solvents, 2 mutual solvents and 1 unclassifiable, all with mixed load savings

With the addition of three high boiling solvents—methyl amyl acetate and the completely new Pent-Oxone* keto-ether and Pent-Oxol* glycol ether—Shell now offers you a full formulating range with all the bulk price benefits of single-source supply.

Glance through these 16 solvents listed below. See how many you are using currently. If there are any you are not using, perhaps you would like samples of them.

IN AUGUST, 1960, Shell Chemical introduced Pent-Oxone, a double-action keto-ether high boiling solvent.

At the same time Shell introduced Pent-Oxol, a glycol ether solvent with especial promise as a bluish retarding, reasonably quick drying high boiler for nitrocellulose.

Now, to round out the high boiling line, Shell Chemical has added methyl amyl acetate.

5 high boilers

This brings Shell's list of high boilers to five. Pent-Oxone, Pent-Oxol, methyl amyl acetate, ethyl amyl ketone and diacetone alcohol.

2 medium boilers

Shell's major medium boiler scarcely

needs an introduction. It's methyl isobutyl ketone.

Shell's second medium boiler is mesityl oxide, an unsaturated ketone with very strong solvent properties.

2 low boilers

Like methyl isobutyl ketone, Shell's two low boilers are industry standards: methyl ethyl ketone and acetone.

4 latent solvents

Shell's four latent solvents are ethyl alcohol, isopropyl alcohol, methyl isobutyl carbinol—an isomeric hexyl alcohol—and secondary butyl alcohol, a solvent for many natural resins, gums and oils.

2 mutual solvents

Hexylene glycol and tertiary butyl alco-

hol are excellent co-solvents for many immiscible substances.

Unclassifiable

Isopropyl ether is not so easy to put a tag on. It is an extractant for fine chemicals, a solvent for ethyl cellulose, and frequently is used to replace ethyl ether where a solvent of lower volatility is wanted.

Mixed load savings

These 16 solvents are all available in tank cars to drums from any of Shell's nine Industrial Chemical offices. Send for samples. And ask the man from Shell how you can save money through mixed load purchases.

*Trademark, Shell Chemical Company

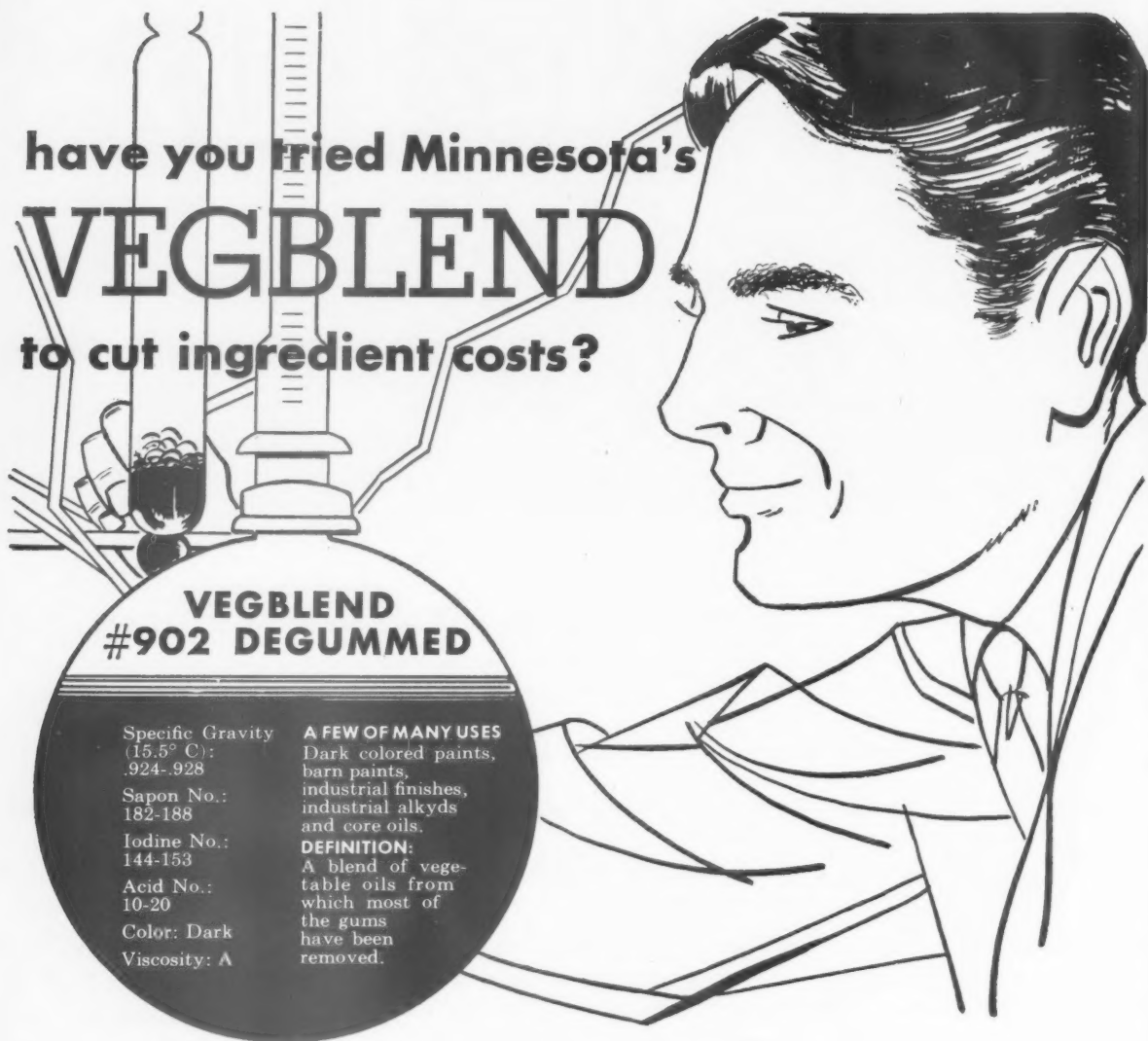
**Shell
Chemical
Company**



Industrial Chemicals Division
110 W. 51 Street, New York 20, N. Y.

A100

have you tried Minnesota's
VEGBLEND
to cut ingredient costs?



**VEGBLEND
#902 DEGUMMED**

Specific Gravity
(15.5° C):
.924-.928

Sapon No.:
182-188

Iodine No.:
144-153

Acid No.:
10-20

Color: Dark

Viscosity: A

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Dark colored paints,
barn paints,
industrial finishes,
industrial alkyds
and core oils.

DEFINITION:

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table oils from
which most of
the gums
have been
removed.

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PAINT and VARNISH
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Title (REG. U.S. PATENT OFFICE)

JUNE
1961

Formerly PAINT and VARNISH PRODUCTION MANAGER
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NEXT ISSUE

A series of articles dealing with the Dia Phenomena as it affects the corrosion of painted steel will begin with our July issue.

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WHAT'S NEWS IN ENJAY TECHNICAL SERVICE



Fine vinyl finish at 10-18% less cost

Here is another example of Enjay customer service. Enjay has solved an important surface coating solvent problem by experimenting with various blends of methyl ethyl ketone with methyl isobutyl ketone for vinyl surface coatings. With a 50/50 blend of these Enjay solvents—users can obtain excellent surface hardness, gloss, and

finish at a saving in cost per pound of solids dissolved, relative to 100% MIBK, of 10-18%. This is one more example of how Enjay is helping its customers turn out quality products at a saving.

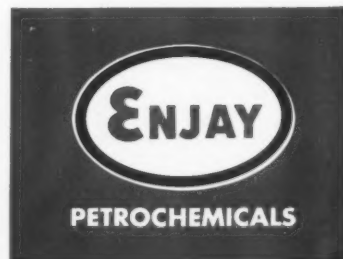
Enjay is a convenient source of basic chemical raw materials for most industrial and chemical needs. Enjay

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EXCITING NEW PRODUCTS THROUGH PETRO-CHEMISTRY

ENJAY CHEMICAL COMPANY

A DIVISION OF HUMBLE OIL & REFINING COMPANY



EDITORIAL COMMENT

Modernize Now!

AS a stimulus for fostering plant modernization, President Kennedy recently proposed a system of tax credits for firms investing in expansion and new equipment.

One aspect of the President's proposal is that it will enable many small firms who are in need of immediate modernization to take advantage of the credit allowed for new investment. For example, the plan contains a special feature designed to discourage companies from holding back investments, to "bunch" them up in a single year and qualify for a bigger credit.

For the most part, business men have reacted favorably to this new tax credit plan for inducing plant modernization. Most feel that the plan would encourage a noticeable, though modest, step-up in capital spending.

In view of these proposals, it might be a good idea for the paint industry to survey its needs in the way of new equipment. Obsolete equipment can have only an adverse effect on production rates and product quality.

Presently, American industry faces serious competition abroad. In his message to Congress the President brings up this very problem. He says—

"Today, as we have serious pressure on our balance of payments position, we must give special attention to the modernization of our plant and equipment. Forced to reconstruct after wartime devastation, our friends abroad now possess a modern industrial system helping them to make formidable competitors in world markets. If our own goods are to compete with foreign goods in price and quality, both home and

abroad, we shall need the most efficient plant and equipment."

New Concept for Solvents

DR. J. S. LONG, Director of the Paint Research Institute, sees a new era for solvents and a new appreciation for the functions of solvents.

Most paint chemists regard solvents as something which is added to a paint to make it sufficiently fluid so that it may be easily applied to a substrate. Until recently, it was not realized that solvents are not simply something to use as a vehicle to get the film onto the surface and then evaporate. Polar solvents can and do exert considerable attractive influence on polar resins. As the solvent molecules leave the film, they drag resin molecules to the surface in an oriented way and leave them oriented at the surface, with the result that the surface layer is different from what it would have been. This increases the resistance against attack by chemicals.

Further investigation showed the effect of thinning an oxidized pentaerythritol-tall-oil-phthalic alkyd with varying percentages of xylene. Free films made from this resin and dried five days were broken in a Scott testing machine. Films thinned with 15% xylene broke at 20% less elongation and 22% less ultimate tensile strength than films of the same dry film thickness, made from the same batch of alkyd, but not thinned at all. This confirms the importance of solvents, particularly as they affect mechanical properties of paints.

In this connection, we bring your attention of two interesting articles on new developments in solvents appearing in this issue, beginning on page 25.

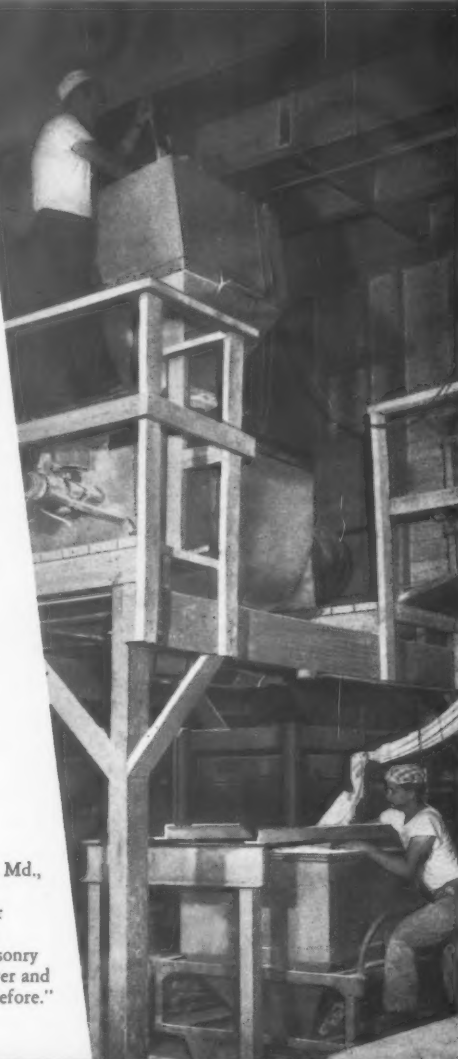
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R. L. Henry, president of U.S. Protective Coatings, Inc., Baltimore, Md., says, "We consider the Entoleter Impact Mill an absolute necessity for proper dispersion of color and other ingredients in our cement-based masonry paints. It is lighter, requires less power and we get color intensity not possible before."



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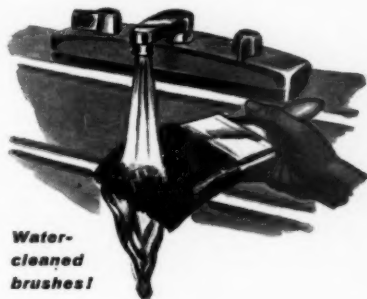
Imagine the sales potential—water thinned paints, water cleaned brushes—with all the traditional advantages of linseed oil paints!

Over ten years in development and testing, Spencer Kellogg's revolutionary new Linaqua is now available to paint manufacturers for continued laboratory evaluation.

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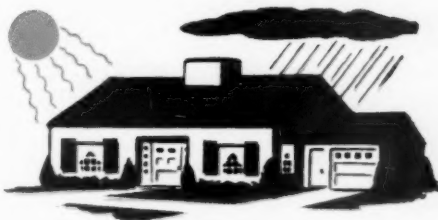
- Adhesion to chalky surfaces.
- No primer needed for normal repaint surface.
- High total solids for 1-coat coverage.
- Excellent gloss and can appearance.
- Excellent leveling and flow properties.
- Ease of manufacture with existing equipment.
- Stable to zinc oxide.
- Solution type, not an emulsion.
- Can be used like conventional housepaints.
- Water cleanup of brushes and tools easier than ordinary water paints.
- Good freeze—thaw stability.

With Linaqua new wood requires only $\frac{2}{3}$ as much labor and paint, as latex. Repainting requires only $\frac{1}{3}$ as much paint and labor as latex.



Water-cleaned brushes!

Linseed oil performance!



No special manufacturing methods and equipment.

- Conventional formulation.
- Same drier systems.
- Good pigment dispersion.
- No special additives needed.
- No vehicle handling problem or foaming.
- Non-corrosive.

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Years of exposure to sun and weather have little effect on the flexibility of RHOPLEX paint films. They expand and contract with the wood under variations of temperature and humidity—resist cracking and peeling. What's more, these paints are highly resistant to yellowing and degradation by ultraviolet light.

As in any paint application, surface preparation is important. New wood needs priming—previously painted wood must be free of scale and chalking. From here on, RHOPLEX AC-33 100% acrylic

emulsion paint is a dream to apply. Goes on like a breeze—no brush drag. Dries smooth as satin—dust-free in minutes—ready for a second coat in less than an hour. Paint in early morning dampness or after a shower without a worry. Use brush, roller or spray. Clean up in a jiffy with water.

Write today for *Progress Report No. 7*, a 57-page booklet giving formulating information, and data on 7-year exposure tests of panels and homes painted with RHOPLEX AC-33 paints.

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&
HAAS**
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THE BENEFITS OF 2-NP
AS A SOLVENT FOR VINYL
AND EPOXY COATINGS

A report from
COMMERCIAL SOLVENTS CORPORATION
NITROPARAFFINS DEPARTMENT

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COMMERCIAL SOLVENTS CORPORATION

NITROPARAFFINS DEPARTMENT

260 MADISON AVENUE, NEW YORK 16, N. Y.

Atlanta • Boston • Chicago • Cincinnati • Cleveland • Detroit • Los Angeles • New Orleans • Newark • New York • St. Louis
San Francisco • IN CANADA: The McArthur Chemical Co. (1958) Ltd., Montreal • IN MEXICO: Comsolmex, S.A., Mexico 7, D.F.



SUBJECT:	2-Nitropropane	DESCRIPTION:	Solvent for vinyl and epoxy coatings
ACTION DESIRED:	Consider 2-NP to achieve higher quality at lower cost		

General

2-NP ($\text{CH}_3\text{CHNO}_2\text{CH}_3$) is a member of the extraordinarily versatile CSC Nitroparaffin family. Its most outstanding characteristic is its unique solvent property which permits the use of larger proportions of low cost alcohols and aromatics in solubilizing a wide variety of coating materials, dyes, organic chemicals, fats, and oils. This unique property is of special interest in the formulation of vinyl and epoxy coatings.

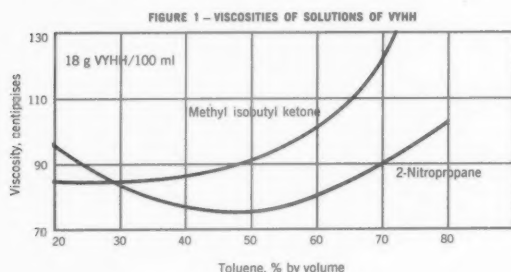
Solvent for Vinyls

With the introduction of 2-NP — for the first time — formulators of vinyl chloride-acetate copolymers were able to obtain coatings with 1) lower viscosity and/or higher solids, 2) medium evaporation rate with better flow, 3) improved solvent release resulting in reduced drying time, and 4) mild odor. In addition to these advantages, the ability of nitrated solvents to displace water results in coatings with better adhesion to hydrophilic surfaces and better weathering properties due to improved dispersion. 2-NP's high flash point and low volatility provide added safety factors.

Research and field experience in the packaging industry has shown that the high solids content of 2-NP-formulated vinyls offers important advantages in the high-speed coating of food and beverage containers. 2-NP also proves useful in vinyl ink applications since it does not attack gelatin or most rubber rolls but still provides outstanding adhesion or "bite" to many plastics.

Low Viscosity and/or High Solids Content

2-NP can be formulated to give vinyl solutions of higher solids content and/or lower viscosity than any other medium evaporating solvent. A typical comparison is shown in Figure 1. In addition, 2-NP solutions have good stability and show no tendency to gel.



Evaporation Rate

The table below illustrates the desirable evaporation rate of 2-NP.

Evaporation Rate Of 2-NP Compared To Other Solvents (Volume)

Acetone	975
MEK	568
Toluol	197
MIBK	186
2-NP	110
n-Butyl Acetate	100
Xylol	69
Cellosolve	38
Isophorone	4.3

Although 2-NP has a slower evaporation rate than many solvents, it escapes from a vinyl film more rapidly than most of the faster solvents shown in the above chart, thus relieving problems of print resistance and residual odor.

Reduced Cost

To evaluate the economics of 2-NP in comparison with another medium evaporating solvent, such as MIBK, we should again refer to Figure 1. We note that in order to obtain comparable solids and viscosities in VYHH* solutions a 50-50 mixture of MIBK-toluol should be replaced by a 30-70 mixture of 2-NP-toluol. This makes it possible for a vinyl formulator to save over \$600 in raw material costs for each tank car of MIBK he now uses, as evidenced by the following calculations:

8,000 gallons MIBK	= \$7,749.00
8,000 gallons toluol	= 2,000.00
16,000 gallons 50-50 mixture MIBK-toluol	= \$9,749.00
4,800 gallons 2-NP	= \$6,336.00
11,200 gallons toluol	= 2,800.00
16,000 gallons 30-70 mixture 2-NP-toluol	= \$9,136.00
	= \$ 613.00 Savings

Solvent for Epoxies

Solvent mixtures based on 2-NP have been found to be superior to other solvent systems for epoxy coatings cured at room temperature. Improvements brought about by the use of 2-NP include much greater chemical resistance, marked reduction in pinholing and water vapor permeability, minimized crawling and cratering, and improved adhesion.

*Bakelite

2-NP is compatible with amine catalyzed systems (with the exception of ethylene diamine) and systems employing urea-formaldehyde, polyamides, or phenolic cross linking agents.

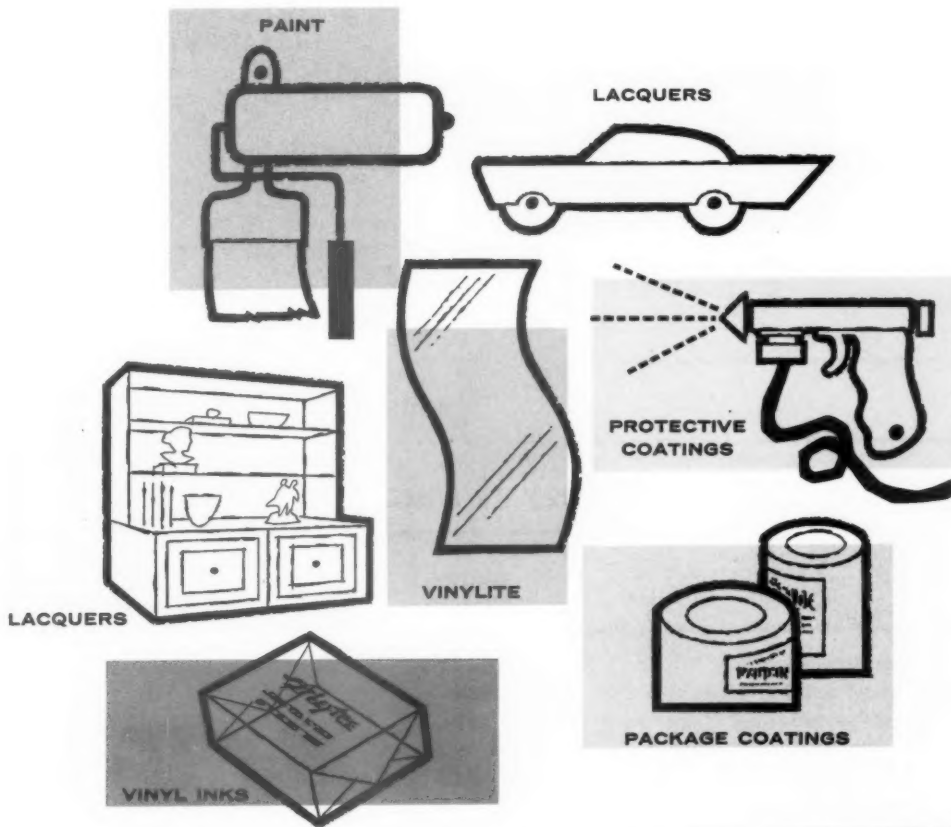
As a rule of thumb, epoxy solvent systems formulated with 2-NP should contain an alcohol in an amount equal to the amount of 2-NP present. A solvent system containing equal parts of 2-NP, alcohol, and aromatic hydrocarbons is suggested as a starting formulation. Other systems can be used with very satisfactory results; however, a 2-NP concentration below 17% tends to minimize the advantages which can be obtained by its use. These advantages are available at no increase in cost since properly formulated solvent blends containing 2-NP are competitive in price with other solvent formulations. 2-NP has an ideal evaporation rate for

spray systems and contributes the favorable flow properties that are indispensable for good finishes.

The ability of nitrated solvents to wet pigments and hydrophilic surfaces, as previously mentioned in the section entitled *Solvents for Vinyls*, also applies to epoxies as well as other vehicles used by the coating industry.

Want more information on 2-NP for Vinyls and Epoxies?

If you would like to have test samples and complete technical data on 2-Nitropropane for your vinyl and epoxy formulations, fill in and mail the coupon below. Or perhaps you would like to have one of our technical representatives look into your particular problem? If so, just mark the coupon accordingly, or drop us a note in the mail.



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____ Please send me samples and data on 2-NP for vinyl and epoxy coatings.
____ Please have your technical representative get in touch with me.

Name _____ Title _____
Company _____
Address _____
City _____ Zone _____ State _____

PHYSICAL PROPERTIES OF 2-NITROPROPANE

FLASH POINTS (°F Tag Open Cup) of 2-NP Compared to Other Solvents

Acetone	16
MEK	30
Toluol	56
MIBK	81
Xylol	85
n-Butyl Acetate	92
2-NP	103
Cellosolve	126
Isophorone	202

Comparison of Lower Limit of Flammability of 2-NP With Other Solvents (% by volume in air)

MIBK	0.9
Xylol	1.0
Toluol	1.27
n-Butyl Acetate	1.7
MEK	1.8
Acetone	2.15
2-Nitropropane	2.6
Cellosolve	2.6

PHYSICAL PROPERTIES OF SOME VINYL SOLVENTS

	2-NITRO- PROPANE	NITRO- METHANE	METHYL ETHYL KETONE	METHYL ISOBUTYL KETONE
Molecular Weight	89.09	61.04	72.10	100.16
Boiling Point, °C	120.3	101.2	79.6	116.0
Vapor Pressure at 20°C, mm	12.9	27.8	77.5	18.1
Specific Gravity at 20/20°C	0.992	1.139	0.806	0.802
Weight per Gallon at 68°F, lb.	8.24	9.48	6.72	6.68
Gallons per Pound at 68°F	0.121	0.105	0.149	0.150
Red Label Required	No	No	Yes	No
Heat of Vaporization at 30°C, cal/g	104	143.3	112.3	93.2
Solubility in Water at 20°C, % by volume	1.7	9.5	31.80	2.5
Solubility of Water in Solvent, % by volume	0.6	2.2	10.90	1.7



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• KURE BLEND-THER

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maximum

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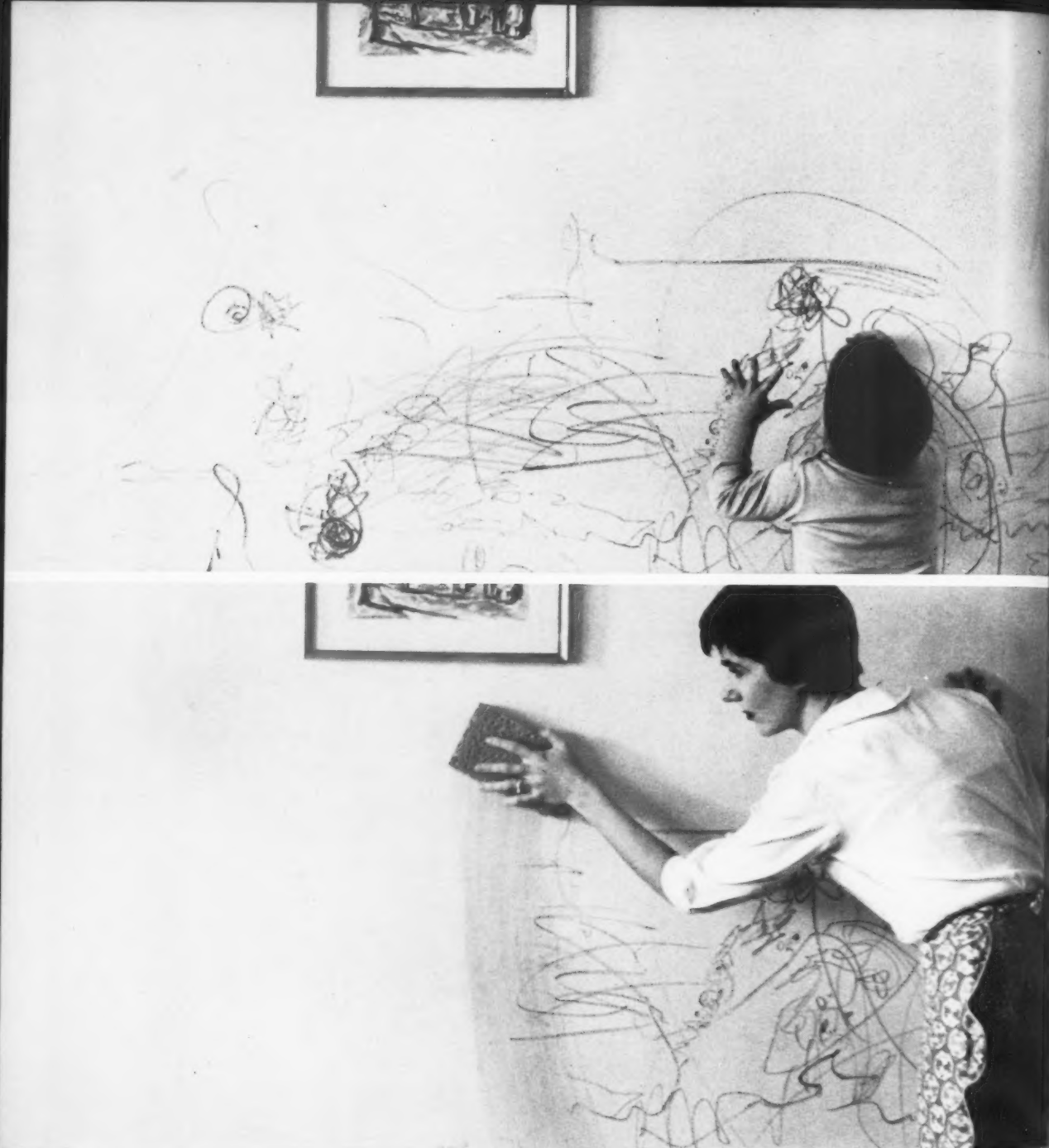
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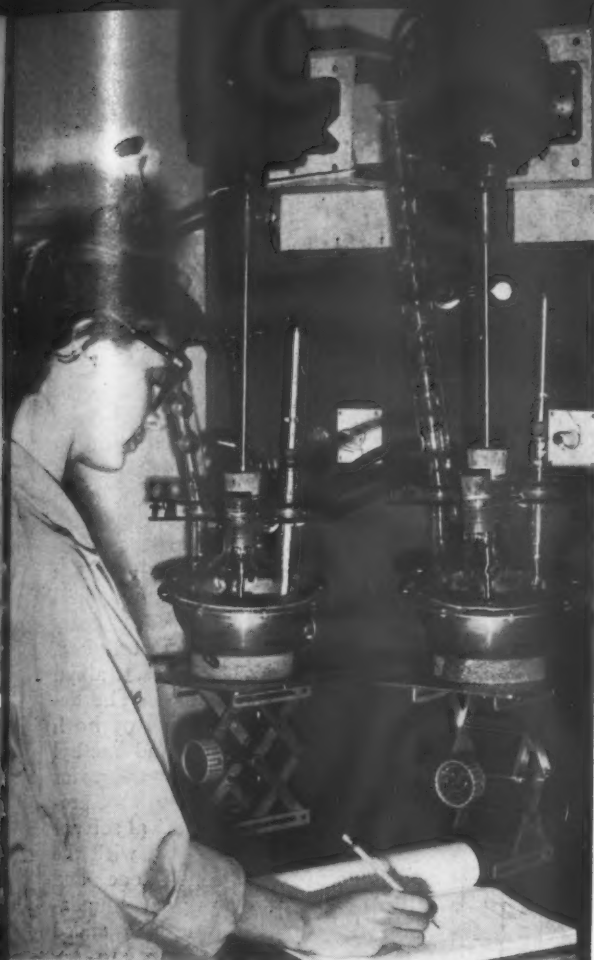


BASIC TO AMERICA'S PROGRESS

PENT-OXONE and PENT-OXOL

Versatile, New High Boilers

By
L. C. Norton
and
R. A. Scherzinger



THE role of organic coatings is becoming more and more important with every improvement in our general technology and standard of living. New and formidable jobs are envisioned for them. Coatings formulators, equipment manufacturers and raw material suppliers have expended great effort toward satisfying these demands. Working towards this common end, they have collectively made outstanding progress.

Raw material suppliers contribute to coatings development in two specific ways. They can assist the formulator through the development and publication of data illustrating the applications of their products. This may include fundamental research in new areas where

specific materials are thought to be potentially useful and it certainly includes demonstration of effective and economical methods of utilizing existing materials in established types of coatings.

Further, the raw material supplier can contribute to coatings technology advancement by making available new materials for the formulator's consideration. The introduction of such materials arouses the interest of imaginative coatings chemists. These new building blocks could be the very key to development of a new protective coating or improvement of an old one. The supplier can further assist by providing ample, sound product applications data.

The general needs of the coatings chemist for solvents in both new and established types of coatings has been given careful study by Shell Chemical Company. As a result of this study and following

intensive laboratory work, Shell has in recent months introduced two new solvents, Pent-Oxone* and Pent-Oxol.* Some of the typical properties of these solvents, 4-methoxy-4-methyl pentanone-2 and 4-methoxy-4-methyl pentanol-2, respectively, are given in Table 1.

Their value in conventional coatings has already been proven and their usefulness in future developments is expected. Both are entirely new high boilers never before commercially available. Both represent new, versatile building blocks for the coatings chemist. Pent-Oxol, a glycol ether-type, performs well as a true high boiling solvent, contributing significantly to nitrocellulose lacquer blush resistance. Contrary to the properties of the usual high boiling solvent, Pent-Oxol has a nitrocellulose dilution ratio characteristic of powerful low boilers. Pent-Oxone is not only new commercially

The authors are associated with the Shell Chemical Co., Union Technical Service Laboratory, Union, N. J.

*Pent-Oxone and Pent-Oxol are trademarks of the Shell Chemical Co.

TABLE 1
TYPICAL PROPERTIES

Properties	PENT-OXOL* Solvent	PENT-OXONE* Solvent
Molecular Weight	132.20	130.18
Purity	99	99
Specific Gravity, 25/25°C	0.891	0.906
Boiling Range, °C	164-169	147-163
Flash Point, °F, TOC	140	141
Solubility Parameter	8.5	8.3
Intrinsic Viscosity, Cps., 25°C	1.9	1.2
Water Solubility, 77°F		
Per Cent in Water	miscible	28
Per Cent Water in	miscible	9
Dilution Ratio, Nitrocellulose		
Toluene	4.7	3.1
"TOU-SOL"®	1.3	0.9
Blush Resistance, Per Cent R.H., 80°F (Eight grams Nitrocellulose per 100 mls)	93	91
Vapor Pressure, mm Hg		
70°C	22.3	31.5
100°C	83.0	112
130°C	244	315
150°C	454	570
Refractive Index, n _D ²⁰	1.4204	1.4181
Surface Tension, dynes per cm	27	26

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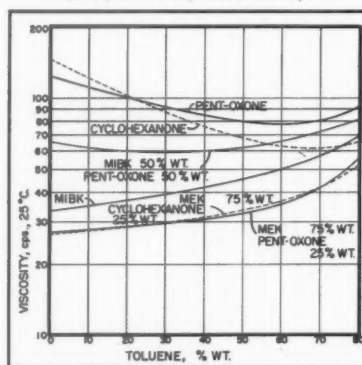
but also represents an entirely new class of chemical solvents. In a single molecule are combined a carbonyl group and an ether link. Thus a keto-ether is born, possessing the outstanding properties of both ketones and glycol ethers. As would be expected of a compound containing such a chemical union, Pent-Oxone is an outstanding and versatile solvent. The formulator will find it a valuable tool in preparing nitrocellulose, acrylic, vinyl, and cellulose acetate butyrate lacquers of all types, alkyd and epoxy enamels, urethane and thermosetting acrylic coatings.

The viscosity data given in Table 2 reflect the wide variety of resins soluble in these high boilers.

Actually, other factors such as volatility, compatibility, and the like, in addition to solvent power, bear heavily on the choice of any high boiling oxygenated solvent to be incorporated in finishes based on these resins. The solubility data shown in the table can be used as a guide to examination of the value of Pent-Oxol and Pent-Oxone in these coatings systems.

Although Pent-Oxone and Pent-Oxol are strong solvents for a variety of film forming resins, their solvent power is not their only distinctive characteristic. Both are high boiling solvents in a true sense. The division between

Figure 1
Solution Viscosity
(15% wt. Vinylite VYHH)



medium and high boilers is, of course, an arbitrary one, roughly as shown by the evaporation curves in Figure 1, but Pent-Oxone and Pent-Oxol evaporate clearly in the high boiler class of solvents.

The importance of the evaporation rate of a solvent cannot be understated. Various film forming ingredients are incorporated into certain coatings for the particular qualities they possess. Regardless of this fact, however, the evaporation rate and other properties of the solvents can and do markedly affect the application, performance and esthetic qualities of the coating system. Flow, pot life, gloss, gloss retention, hardness, impact resistance, flexibility, weatherability, blush resistance, and many others

can be influenced to a considerable extent by choice of solvent. The properties normally expected of a high boiling solvent can be realized fully only when true high boiling solvents, such as Pent-Oxone and Pent-Oxol, are used.

The desirable properties of a number of solvents are utilized by critical blending in the formulation of a coating solvent system or thinner. If a small group of oxygenated solvents were to be singled out and labeled as fundamental in the formulation of diverse types of coatings, acetone, methyl ethyl ketone, and methyl isobutyl ketone would surely be selected. These could be profitably used in both a technological and an economical sense in virtually any type of coating system from nitrocellulose, acrylic, and vinyl lacquers, to alkyd enamels and urethanes. The desirable characteristics of both methyl ethyl ketone and methyl isobutyl ketone could then, for example, be combined to give properties of any hypothetical solvent between the two. Now, with the availability of Pent-Oxone and Pent-Oxol, the group of "fundamental" solvents can be expanded and properties intermediate between methyl isobutyl ketone and either Pent-Oxone or Pent-Oxol can readily be achieved.

Acrylic Lacquers

The high-low (volatility) solvent system was originally developed to achieve certain advantages in the application of nitrocellulose lacquer. In the rise of acrylic lacquers to prominence, the high-low system has again been found effective. An example of a thinner based on this principle and designed for use in thinning commercial base lacquers is given in Table 3.

With this development, however, a burden was placed on the slowest evaporating part of the acrylic lacquer thinner which could not be adequately borne by the available high boiling solvents alone. In fact, of all the high boilers considered, only one, ethylene glycol monomethyl ether acetate, could give effective performance. This left the formulator little technological or economic latitude in the formulation of his acrylic lacquers.

Before the introduction of Pent-

Oxol and Pent-Oxone, acrylic lacquer chemists at work in the Shell technical service and product application laboratory at Union, New Jersey, took a long and exhaustive look at these two high boilers in lacquers based on each of the acrylic resins available. In this study, it was noted above all that use of either Pent-Oxone or Pent-Oxol led to lacquer gloss levels that were not obtainable before with other high boilers at the same concentration. Such a feature can be readily translated into lower manpower and elapsed time costs in the rubbing operation. During the course of the work performed, other

variables, such as force dry time and temperature, spray room temperature, topcoat thickness, primer smoothness, operator effect, pigmentation, and several others were carefully controlled so that comparisons between high boiling solvents would carry full validity. Proceeding in this manner, it was found that the superiority of Pent-Oxone and Pent-Oxol in their contribution to film gloss was indeed sustained no matter what set of conditions was employed. A typical nitrocellulose-modified acrylic lacquer containing Pent-Oxone or Pent-Oxol is outlined in Table 4.

Vinyl Lacquers

A great variety of solvents from which to choose confronts the chemist in formulation of the usual lacquer coating. An exception, however, is the solution coating based on vinyl chloride-vinyl acetate copolymer resins. There are only a limited number of effective vinyl resin solvents known and these, with few exceptions, belong to the ketone class of organic compounds. As in the selection of solvents for other lacquers, the volatility of the solvents available must be carefully considered. A variety of volatility patterns can be achieved by blending acetone, methyl ethyl

TABLE 2
SOLUBILITY OF RESINS¹

Resin	Supplier	Viscosity, Cps., 25°C in	
		PENT-OXOL* Solvent	PENT-OXONE* Solvent
Nitrocellulose			
S.S. 1/2-Second Grade, Eight Grams per 100 Mls	—	100	67
S.S. 1/2-Second Grade, Eight Grams per 100 Mls	—	58	38
Acrylics			
Acryloid A-21, 15 Per Cent Weight	Rohm and Haas Company	30	22
Acryloid B-44, 15 Per Cent Weight	Rohm and Haas Company	25	20
Acryloid B-66, 15 Per Cent Weight	Rohm and Haas Company	25	15
Acryloid AT-50, 30 Per Cent Weight	Rohm and Haas Company	90	63
Phenolics			
Bakelite BKS-2600	Union Carbide Plastics Company	87	45
Amberol F-7	Rohm and Haas Company	37	19
Methylon 75108	General Electric Company	11	5
Ureas			
Beetle 227-8	American Cyanamid Company	31	26
Uformite F-240	Rohm and Haas Company	11	7
Beckamine P-196	Reichhold Chemicals, Inc.	14	8
Melamines			
Cymel 248-8	American Cyanamid Company	19	11
MM-55	Monsanto Chemical Company	23	14
Resimene 872	Monsanto Chemical Company	29	16
Maleics			
Cellolyn 102	Hercules Powder Company	18	9
Amberol 801	Rohm and Haas Company	32	17
Alkyds			
Aroplaz 2480	Archer-Daniels-Midland Company	27	24
Rezyl 412	American Cyanamid Company	13	14
Cellolyn 502	Hercules Powder Company	25	19
Cellolyn 582	Hercules Powder Company	17	12
Duraplex ND 77B	Rohm and Haas Company	42	31
Aroplaz 6006	Archer-Daniels-Midland Company	27	23
Cycopol 102	American Cyanamid Company	80	62
Other			
Half-Second Butyrate, 10 Per Cent Weight	Eastman Chemical Products, Inc.	117	75
Vinylite XYHL, 5 Per Cent Weight	Union Carbide Plastics Company	55	(2)
Parlon P	Hercules Powder Company	1260	630
Buton 200	Enjay Chemical Company	45	31
EPON® 1001	Shell Chemical Company	3	3
EPON® 1002, 50 Per Cent Weight	Shell Chemical Company	(2)	240
EPON® 1007	Shell Chemical Company	(2)	107

(1) Commercially available resin (solids or in solution) reduced to 30 per cent weight solids, except as indicated, with Pent-Oxol or Pent-Oxone. Viscosities of resulting solutions measured in absolute units with capillary tube viscometers.

(2) Not determined.

*Shell Trademark

TABLE 3

EXAMPLE OF ACRYLIC LACQUER THINNER

Solvent Composition, Per Cent Volume	
Acetone	15
Pent-Oxone* or Pent-Oxol* Solvents	30
Ethyl Alcohol or Isopropyl Alcohol	10
Xylene	35
Toluene	10

100

*Shell Trademark

ketone, and methyl isobutyl ketone.

The choice of vinyl resin solvent is not near so clear-cut in the case of high boilers. It is true that the high boiler is used primarily for volatility control and control of the factors which are in turn affected by volatility. High boilers are not employed for their solvent power contribution but, of course, the greater solvent power they have the better. Both cyclohexanone and isophorone are noted for exceptional solvency as high boilers. Unfortunately, however, both are high in cost. Any other high boiler in the same volatility class and possessing similar solvent power would naturally stimulate the interest of the vinyl lacquer chemist if it were lower in cost and odor. Pent-Oxol does not meet the most important of these requirements. As a glycol ether, it is not a good solvent for vinyl chloride-vinyl acetate copolymers. It provides some peptizing action on polyvinyl chloride and so could conceivably be effective as a vinyl organosol

dispersant. Pent-Oxone, on the other hand, offers an exceptional balance of properties. It is a high boiler in a true sense as can be seen by the evaporation curve in Figure 1. It is mildly camphor-like in odor and is moderate in cost. But above all, Pent-Oxone is a good vinyl resin solvent and displays a high tolerance for hydrocarbon diluents. Illustrations of the solvent power and diluent tolerance of Pent-Oxone are given for a representative vinyl resin in Figure 2.

Examination of Figure 2 reveals some difference in solvency, as measured by solution viscosity, between Pent-Oxone and the reference high boiler, cyclohexanone. There are several critical points to be kept in mind when making comparisons of solvents. First, the differences in viscosity between the solvents must be properly weighed against solvent costs and odors. Secondly, it must be realized that the high boiler will normally be used in conjunction with fast- and medium-evaporating solvents in

addition to diluent. The greatest part of the solvency requirement will be expected of these latter types of solvents.

Viscosities of solutions containing solvent blends, closer to practical usage, are also given in Figure 2. It can be seen that Pent-Oxone fits in quite well when properly combined and balanced with other solvents likely to be included in a complete vinyl lacquer formulation. There is, for example, little difference in the two high boilers when each is used in combination with methyl ethyl ketone. It should be noted also that methyl isobutyl ketone and Pent-Oxone can be suitably blended to give the solvency and volatility characteristics envisioned for any arbitrary solvent lying between them. Or Pent-Oxone can be used alone if lowest volatility is required. The trio of Pent-Oxone, methyl isobutyl ketone, and methyl ethyl ketone thus provide the formulator with a small, fundamental group of solvents for effective formulation of vinyl lacquers.

In all examples given here, solution of vinyl resin in solvent was effected by mixing at 1700 rpm and 60°C for a uniform time in a mixing kettle. Solutions were then stored for seven days prior to viscosity measurement. Viscosities were determined using the highly precise capillary viscometers. Solution storage for seven days was felt advisable due to the inherent tendency of vinyl resin solutions to increase in viscosity during the first two or three days after preparation. Solution viscosity then remains essentially constant on further storage in most cases. Seven days elapsed time before viscosity measurement therefore removes some of the experimental variability associated with tests of this kind. It should be pointed out, however, that further mixing subsequent to solution storage and viscosity build-up is effective in returning the solution viscosity level to near its original value. Such mixing of the lacquer is normally executed immediately before or during its use.

Nitrocellulose Lacquers, Thinners

Some of the properties of Pent-Oxone and Pent-Oxol have been given in Tables 1 and 2. They can be seen to be powerful nitrocellulose

Figure 2
Solvent Evaporation Rates

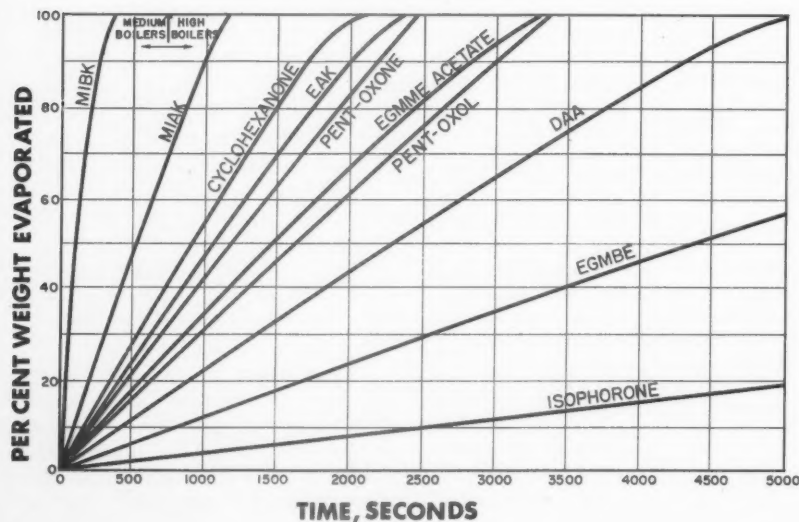


TABLE 4

EXAMPLE OF NITROCELLULOSE-ACRYLIC LACQUER THINNED TO SPRAYING VISCOSITY

Solids Concentration, Per Cent Weight	16
Solids Composition, Per Cent Weight	
¹ Acryloid B-66	61.5
R.S. $\frac{1}{2}$ -Second Nitrocellulose	15.4
² Santicizer 160	6.1
Pigment	17.0
	100
Solvent Composition, Per Cent Volume	
Acetone	8
Methyl Ethyl Ketone	17
Ethyl Alcohol or Isopropyl Alcohol	10
Pent-Oxone* or Pent-Oxol* Solvents	15
Toluene	50
	100

*Shell Trademark
(1) Rohm and Haas Company
(2) Monsanto Chemical Company

solvents in the high boiler class as indicated by both solution viscosity and dilution ratio. In addition, their contribution to flowout and blush resistance is notable. The camphor-like odor of both Pent-Oxol and Pent-Oxone should also be an asset. Some suggested formulations for illustration of the

use of Pent-Oxone or Pent-Oxol are provided in Table 5.

A conventional wood lacquer, a high-solids lacquer and a hot spray formulation are given in order in the table. These are followed by a brushing lacquer, a conventional lacquer thinner, and a high-low (volatility) thinner. Other vari-

ations for nitrocellulose lacquers are of course possible. It is likely, for example, that Pent-Oxone and Pent-Oxol could be used in combination with other, low water soluble high boilers in multicolor lacquers.

The examples in the table refer to Pent-Oxol as well as Pent-Oxone. The effect of Pent-Oxol on nitrocellulose blush resistance bears special note. Tests show that Pent-Oxol can be employed as an additive for economy thinners to improve blush resistance during climatic conditions where the need for a blush retarder is indicated. The performance of Pent-Oxol in this respect is similar to that recognized for the butyl ether of ethylene glycol, yet Pent-Oxol is moderate in cost. Further, since Pent-Oxol is not unduly slow in evaporation rate, it can be used without difficulty as an effective high boiler in completely balanced, higher quality thinners. There is, therefore, no need to have on hand two kinds of high boilers, one for use in complete thinners and the other as a blush

TABLE 5

EXAMPLES OF NITROCELLULOSE LACQUERS AND THINNERS

	Conventional	Hi-Solids	Hot Spray	Brushing	Conventional	H -Lo
Solids Concentration, Per Cent Weight	16	31	31	27	—	—
Solids Composition, Parts by Weight						
R.S. $\frac{1}{2}$ -Second Nitrocellulose	10	—	—	—	—	—
R.S. $\frac{1}{4}$ -Second Nitrocellulose	—	—	10	10.0	—	—
R.S. 18-25 Cps. Nitrocellulose	—	10	—	—	—	—
Alkyd, Nonoxidizing, Short Oil	8	8	10	3.0	—	—
Modified Pentaerythritol Rosin Ester	2	—	—	—	—	—
Maleic Resin	—	—	—	2.0	—	—
Ester Gum	—	8	—	—	—	—
Castor Oil	2	5	4	2.5	—	—
Diocetyl Phthalate	2	5	4	2.5	—	—
Solvent Concentration, Per Cent Volume						
Acetone	—	—	—	—	—	15.0
Methyl Ethyl Ketone	—	7.0	—	—	—	20.0
Methyl Isobutyl Ketone	32.0	21.0	32.0	30.0	27.0	—
Pent-Oxone* or Pent-Oxol* Solvents	8.0	5.0	11.0	15.0	9.0	20.0
Isopropyl Alcohol	6.2	10.7	—	3.9	9.0	5.0
Ethyl Alcohol (ex. NC)	3.8	6.3	12.5	8.1	—	—
Methyl Isobutyl Carbinol	5.0	—	6.0	—	5.0	5.0
Toluene	20.0	10.0	38.5	—	—	—
¹ CYCLO SOL® 53	—	—	—	—	20.0	10.0
¹ "TOLU-SOL"®	—	—	—	—	20.0	25.0
¹ Shell Sol 36	—	—	—	15.0	—	—
	100.0	100.0	100.0	100.0	100.0	100.0

*Shell Trademark
(1) Shell Oil Company

TABLE 6
TYPICAL AMINE-CURED EPOXY ENAMEL

Solids Composition	
Resin	¹ Epon [®] 1001 Resin
Flow Control Agent	One Per Cent ² SR-82
Curing Agent	6 phr Diethylene Triamine
Solids Concentration, Per Cent Weight	50
Solvent Composition, Per Cent Weight	
Methyl Ethyl Ketone	5.0
Isopropyl Alcohol	12.5
Methyl Isobutyl Carbinol	12.5
Xylene	60.0
Pent-Oxone* or Pent-Oxol* Solvents	10.0
	100.0

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(2) General Electric Company

retarder. Pent-Oxol fits both situations.

Epoxy Enamels

The epoxy resin finish is selected for situations which require superior performance. It is known that solvent systems used to deposit epoxies can exert a profound influence upon pot, application, and performance properties of epoxy enamels. Pot life, hardness, gloss and gloss retention, flexibility, and impact resistance can be seriously affected by improper solvent choice and solvent balance.

Combinations of Pent-Oxone or Pent-Oxol with methyl isobutyl ketone, methyl ethyl ketone, toluene, xylene and alcohols can be achieved which lead to balanced properties for both amine-cured and phenolic- or amino-resin-cured epoxy enamels. A typical amine-cured formulation based on ¹Epon[®] 1001 and containing Pent-Oxone or Pent-Oxol is given in Table 6.

The solvent systems employed need not be complex, however. Depending upon the balance of properties desired, solvent systems as simple as equal parts of toluene and Pent-Oxol or Pent-Oxone can be employed in the converted epoxy enamels based, for example, on Epon 1007.

Thermosetting Acrylic Enamels

The acrylic resins have been widely recognized as excellent bases for lacquer coatings where high gloss, gloss retention, and color stability are especially required. These highly desirable properties

have made the thermoplastic acrylic resin a popular ingredient in metal lacquers of all kinds. More recently, thermosetting acrylics have been introduced. These resins retain the outstanding properties of their thermoplastic precursors but, in addition, provide superior detergent, solvent, and stain resistance, hardness, and heat resistance. Combined with Epon 1001 epoxy resin, properly pigmented, and deposited from a suitable solvent system, they yield excellent appliance enamels.

The solvent system employed in

enamels based on the ²Acryloids AT-50 and AT-51 can be a simple blend of equal parts xylene, a high boiling aromatic naphtha such as ³Cyclo Sol[®]63, and either Pent-Oxone or Pent-Oxol. An example of the composition of a typical enamel is shown in Table 7.

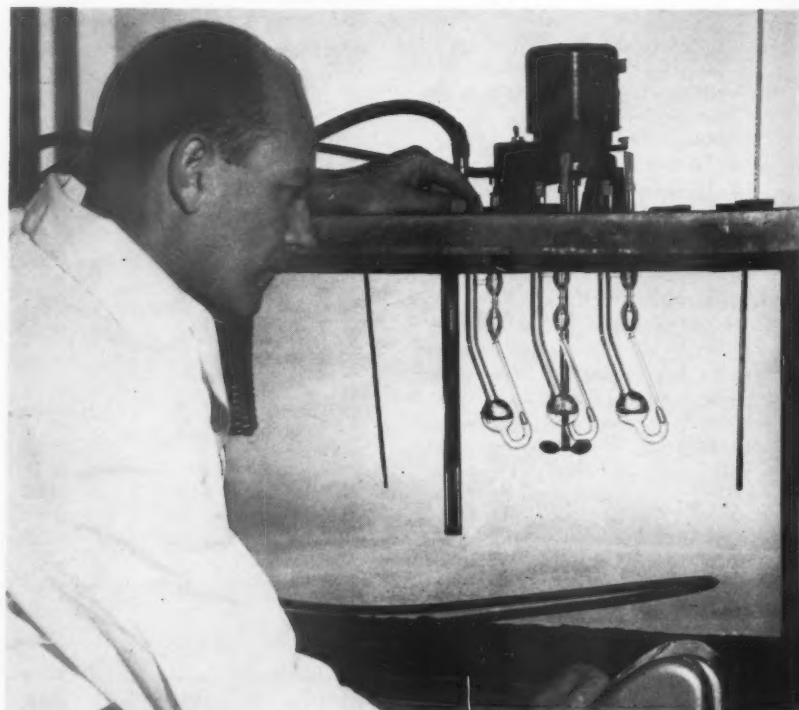
Excellent properties are obtained regardless of which of the two high boiling ethers, Pent-Oxol or Pent-Oxone, is used. When the two solvents are compared in a highly critical manner, some superiority in flexibility of the Pent-Oxone containing enamel is discernible. On the other hand, there is a suggestion in test data that Pent-Oxol may provide somewhat better detergent resistance. These differences, however, are slight when compared to the over-all high quality of either of the two systems.

Urethane Coatings

The chemical mechanism utilized in the production of polyurethane foams has, in recent years, been applied to a new class of protective coatings. Since their introduction, urethane coatings have shown an outstanding rate of growth. This

2. Rohm and Haas Co.

3. Shell Oil Co.



Viscosity measurement by Cannon-Fenske tube is used to determine solvent power of test solvents for various resins.

1. Shell Chemical Co.

TABLE 7
THERMOSETTING ACRYLIC ENAMEL

Solids Concentration, Per Cent Weight	48.0	48.0
Solids Composition, Per Cent Weight		
¹ Acryloid AT-50 (100%)	46.7	—
¹ Acryloid AT-51 (100%)	—	46.7
² Epon® 1001 (100%)	8.3	8.3
Titanium Dioxide, Rutile	45.0	45.0
	100.0	100.0
Solvent Composition, Per Cent Weight		
Pent-Oxone* or Pent-Oxol* Solvents	16.0	16.0
³ Cyclo Sol® 63	4.9	4.9
Xylene (including solvent from resin)	54.8	65.7
Normal Butyl Alcohol } (from resin solution)	13.4	13.4
⁴ Methyl "Cellosolve" }	10.9	—
	100.0	100.0

*Shell Trademark
(1) Rohm and Haas Company
(2) Shell Chemical Company
(3) Shell Oil Company
(4) Union Carbide Chemicals Company

TABLE 8
EXAMPLE OF TWO-PACKAGE URETHANE SYSTEM

Solids Concentration, Per Cent Weight	
¹ Multron R-4	9
¹ Multron R-10	9
¹ Mondur CB-75	22
Solvent Composition, Per Cent Weight	
Pent-Oxone* Solvent	30
Xylene	30
	100
Ratio, -NCO/-OH	1.2

*Shell Trademark
(1) Mobay Chemical Company

type of coating has been recognized for its hardness, durability, flexibility, abrasion resistance and chemical and solvent resistance. Early problems in handling of components and color retention are being corrected.

In view of the nature of the urethane mechanism, solvent choice is limited to some extent. Alcohols and glycol ethers, due to the presence of labile hydrogen, are among the classes of solvents which cannot be employed. Ketones and esters perform well as solvents, provided that impurities reactive with isocyanate are minimized. Ester solvents, normally containing acids, water, or alcohol, can and have been produced in special urethane grades with low impurity levels. Ketone solvents, customarily supplied at high purity, require no upgrading for use in urethane coat-

ings. It is well, therefore, to check purity levels of solvents to be employed.

General study of Pent-Oxone at Shell's Union Technical Service Laboratory included its evaluation in urethane coatings. Pent-Oxone was found to be a strong and effective solvent for urethane components. Since Pent-Oxone is supplied at high purity, it requires no upgrading to qualify for the urethane application. Periodic analysis of Pent-Oxone and toluene diisocyanate combinations during prolonged storage reveals isocyanate functionality remaining at any particular interval to be essentially equivalent to that of combinations of the isocyanate and other popular urethane solvents.

Equal parts of Pent-Oxone and xylene provide a suitable solvent combination for urethane coatings. An example of a two-package urethane system is given in Table 8.

Other Types of Coatings

The utility of Pent-Oxone and Pent-Oxol extends beyond the areas so far covered here. The solubility data previously referred to in Table 2 suggest many more types of coatings where these new high boilers will be found useful. Depending upon the degree of volatility control required, for example, Pent-Oxone or Pent-Oxol can be employed in ⁵Half-Second Butyrate lacquers for plastics, toys, paper, leather, and wood.

Pent-Oxol is useful in polyvinyl butyral lacquers not only for adjustment of volatility but also for

(Turn to page 99)

5. Eastman Chemical Products, Inc.

Application of test coatings for evaluations is done by automatic spray apparatus.



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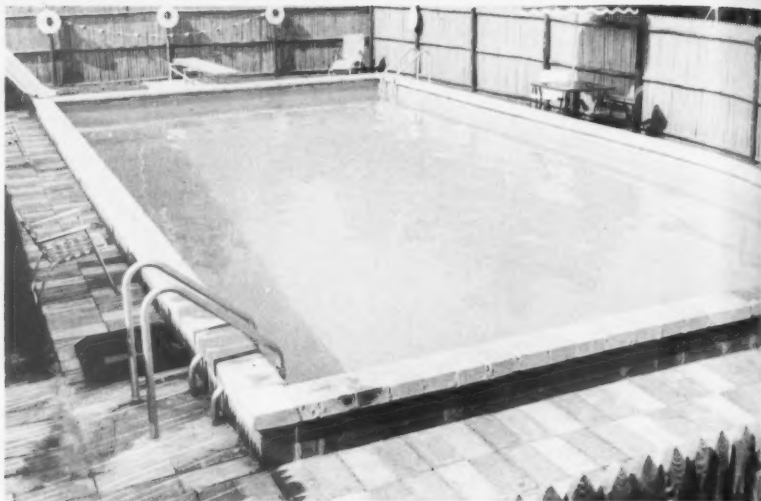
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Coating News From Hercules



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chandising help for our many Parlon customers who make pool paints, a copy is yours for the asking. You will find it equally useful if you want to paint your pool right, or would like to find out more about this growing market.



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Also soluble in esters, ketones, hydrocarbons, compatible with a broad range of film-formers and with emulsions and latices. It contributes good adhesion, and promotes hardness, without the expected loss in flexibility. Leveling action in emulsions is excellent. That about sums up the interesting values of Pentalyn® 255, and indicates why it is arousing interest in paper coatings, packaging lacquers, leather finishes, floor-care compositions, flexographic and steam-set inks, and a growing number of similar applications. With this range of possibilities, you can see why we feel that everyone should have a sample of Pentalyn 255. Write for yours, or ask your Hercules Synthetics Department contact.

Protective Coating Notes

The high solvency and antiskinning properties of Yarmor® Pine Oil are proving useful when many of today's highly reacted resins are used in coating formulations. Marginal incompatibilities can be controlled with the high terpene-alcohol content of the pine oil. Slow evaporation keeps the wet film open for proper flow-out and leveling.

Anyone for fan belts? Not all experimental samples fulfill their intended destiny; sometimes the unexpected occurs. For instance, when following up a recent sample of Hercules® Ethyl Cellulose, we found that the sample, in solution form, had been used to dress a worn, slipping, leather drive-belt. Result: six months' extra belt life. Does this suggest another new market for Hercules Ethyl Cellulose?

Nitrocellulose furniture lacquers modified with catalyst-convertible urea-formaldehyde resins develop extra resistance to water, alcohol, nail polish remover, and other organic solvents. These lacquers have up to 30% solids at spraying viscosities, and retain the advantages of conventional lacquers. CSL-148B, reporting our work on this subject, is available on request.

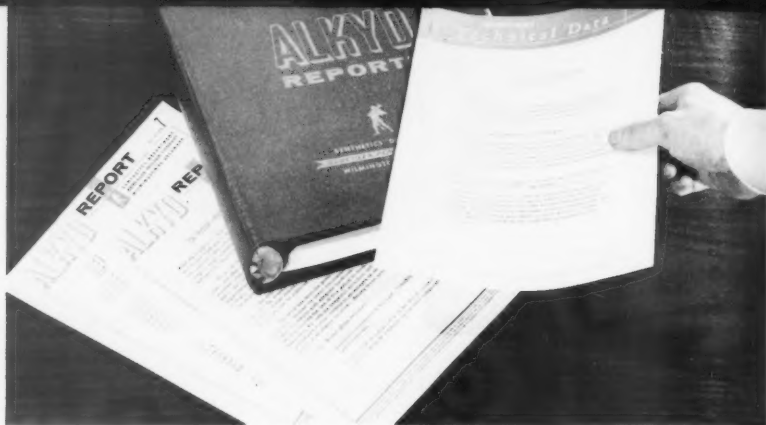
Some formulators who use Natrosol® 250 are interested in the H-type (with viscosities of 20,000 cps. in 1% solution) for its raw-material economy as a thickener in emulsion paints; others have a primary interest in the M-type (medium viscosity) for smooth brushing and leveling. Have you tried both types? If not, may we supply you with appropriate samples?

The nitrocellulose content of base solutions can now be quickly and accurately determined, with no more complicated laboratory equipment than an analytical balance and a drying oven. You can easily find out who goofed when solution viscosities don't come out right. Simplicity comes by using a toothpaste tube to preserve the sample against loss of solvent; weighing from the tube by difference (again, no loss of solvent); diluting with acetone; and, with a flick of the stirring rod and a bottle of toluene, precipitating the nitrocellulose as a fine, fibrous powder which can be easily dried and weighed. This new method is fully described in CSL-163 on analytical methods for lacquers. Your copy is free; write for it or ask your Cellulose Products' Department representative.

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Hercules Alkyd Reports can save you research dollars. Coverage: theory of polyol structure and properties of finished resins; standard laboratory methods for preparation; formulation for long-, medium-, and short-oil types with drying

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RECENT TRENDS IN SOLVENTS

for the

COATINGS INDUSTRY

By

Robert H. Duzy

THE continuing development and acceptance of new resin systems by the coatings industry is of great significance to the users of solvents. The solvents used with these resin systems are, for the most part, the same ones available to the industry since 1945 with the addition of several specialty solvents and some new members to the older categories.

The development of new coatings based on reactive polyurethane resins opened a market potential for high-purity ester solvents. Accordingly, a number of ester solvents meeting these stringent requirements were made available to the coatings industry. The workhorse solvents of the business, however, continue to be esters, ketones, glycol-ethers, alcohols, and

aromatic and aliphatic hydrocarbons.

Growth in the Coatings Industry

As protective coatings go, so go the related solvents—both in quantity and type. The over-all protective coatings industry can anticipate continued growth in the next decade with an increase in per capita consumption of paints. But there will be some adjustments within the industry. There should be an increase in the importance of industrial coatings as related to trade or consumer sales. It is in the industrial coatings field that the newer resin systems such as polyurethanes epoxies, new copolymers, and some improved latexes will find widest application.

Alkyd resin systems have been the leaders by a wide margin, ex-

ceeding the next most widely used resins by several-fold. It is anticipated that inroads will be made into the use of alkyd resin systems by newer and improved latex systems for industrial, commercial, and interior paint markets.

Latex systems based on styrene or polyvinyl acetate and their copolymer resins are currently used at about one-third the volume of alkyd resin systems. Next comes a group of resin systems, each accounting for about one-half or less of the volume of latex systems: cellulose (mostly nitrocellulose), polyvinyl chloride and copolymers, and phenolics. Close behind the phenolics are resin systems such as acrylic, epoxy, and natural resins. The remainder of the coatings market, a little more than two per

TABLE I.—Isocyanate Equivalents of Various Solvents

(Weight in grams of solvent that will combine with one gram equivalent of phenyl isocyanate)

Solvent	Isocyanate Equivalent
Toluene (distilled).....	10,000
"Cellosolve"* Acetate (urethane grade).....	9,700
Ethyl Acetate (urethane grade).....	7,000
Butyl Acetate (urethane grade).....	6,000
Butyl "Cellosolve"* Acetate..	6,000
Diisobutyl Ketone.....	5,300
Methyl "Cellosolve"* Acetate.....	4,400
Methyl Isobutyl Ketone	4,400
Ethyl Acetate.....	4,200
Butyl Acetate.....	2,100
Methyl Ethyl Ketone.....	2,100

cent of the total resin market, is comprised of coatings using polyurethanes, polyamides, polyesters, chlorinated rubber, and others.

Of the above resin systems those requiring solvent knowledge and technology and to be discussed in greater detail in this article, are: polyurethanes, epoxies, nitrocellulose, vinyls, and acrylics.

Polyurethane Resin Systems

The use of polyurethane resins in protective coatings is a relatively new development. Volumewise, these materials do not have much effect on today's coatings market. However, the basic abrasion-resistant and tough finishes possible from polyurethane resins presage a continuing growth in the coming decade.

There are four basic urethane

*Cellosolve, registered trademark of Union Carbide Corporation.

coatings systems which may be described briefly as follows:

1) A one-component system containing no free isocyanate. Unsaturated fatty acid esters containing hydroxyl groups are reacted with toluene diisocyanate to cross-link the ester chains. Drying occurs through oxidation of the double bonds.

2) A one-component system containing an isocyanate-terminated urethane polymer which is cured by atmospheric moisture.

3) A two-component system in which a polyol-isocyanate adduct is mixed with a polyhydroxyl intermediate just before application. The coating cures at room temperature.

4) A one-component system consisting of two ingredients and requiring a heat cure. One of the ingredients is a polyol-isocyanate adduct which has been blocked to make the isocyanate groups non-reactive until unblocked by heat. The second ingredient is a polyhydroxyl compound.

The first basic type is generally referred to as a non-reactive urethane coating since it contains no free isocyanate. These non-reactive urethane coatings are convenient to use but they sacrifice much of the physical endurance inherent in the polyurethanes. Typical solvents used with the non-reactive urethane coatings are the aromatic and aliphatic hydrocarbons.

Reactive polyurethane coatings (types 2, 3, and 4) allow the user to exploit the full potential of these tough and abrasion-resistant coat-



Hardness tester is used to measure the hardness of a new paint formulation. Coatings are also prepared to evaluate formulations in terms of viscosity, evaporation rates, dilution ratios, etc.

ings. Such systems will find their primary applications in industrial markets because of the problems in handling, mixing, and using these reactive coatings.

The manufacture and application of reactive urethane coatings usually are carried out in solution form in the presence of 30 to 50 per cent solvents by weight. Solvent choice is especially important in such systems. They must be inert to reaction with the isocyanate portion of the system. Some solvents (alcohols and other solvents containing reactive hydrogens) react with the isocyanate thus eliminating their use in urethane coatings.

The choice of solvents for the reactive urethane coatings depends both on solvent strength and degree of reactivity of the solvent with free isocyanate groups. The loss of isocyanate functionality by improper choice of solvents can lead to poorer shelf life of one-component, moisture-cure, urethane systems and prevent the ultimate reaction of the two-component urethane system which could de-

(Turn to page 97)



Robert H. Duzy

Mr. Robert H. Duzy is Group Leader, Surface Coatings, for Union Carbide Chemicals Company, Division of Union Carbide Corporation, at the Tarrytown, New York, Technical Service Laboratory. He has fifteen years of experience in evaluating solvent properties and systems for various coatings resins. He received his B.S. degree in chemistry from Kent State University, Kent, Ohio, in 1944. Then, following a two year period in the Navy, he joined the Mellon Institute, Pittsburgh, Pennsylvania, and was engaged in the Organic Synthesis Fellowship for which Union Carbide Chemicals was the donor company. Mr. Duzy is the author of a number of articles about solvents for the coatings industry.



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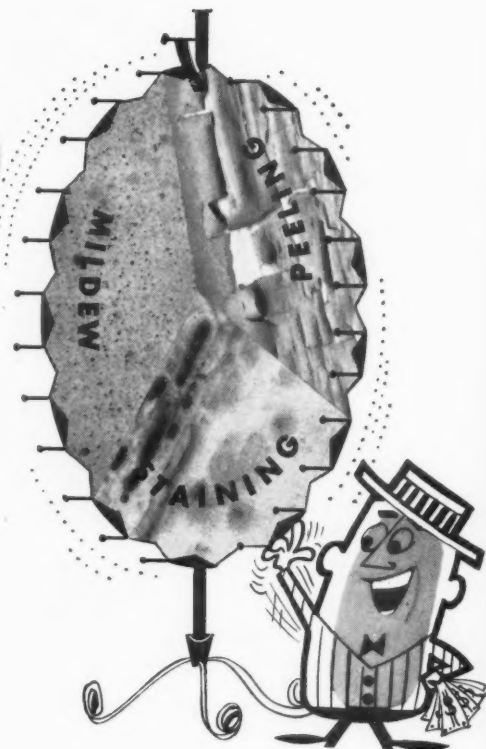
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New low-luster or flat-breather type house paints have been able to solve some of the problems posed by wide differences in today's building materials, but they also have created other hazards—discoloration by mildew growth, unsightly staining and peeling.

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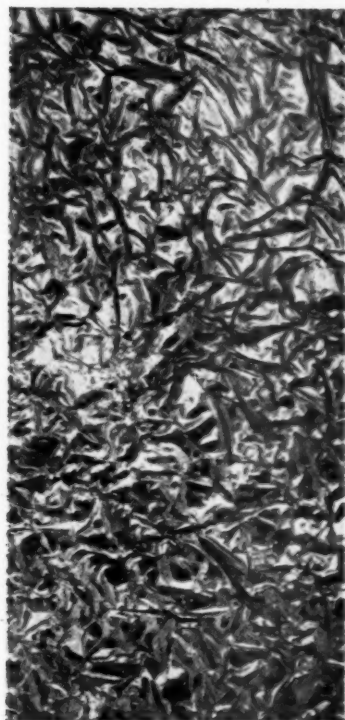
What's News in Enjay Resins...



Buton 200 resins on aluminum foil



Same foil crumpled



Foil straightened out after crumpling

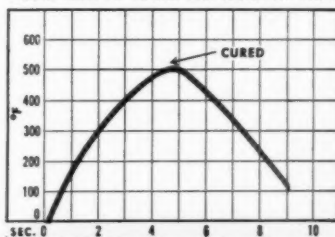
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As you can see above, Buton resins provide excellent adhesion on aluminum. Tests have shown that Buton-based coatings adhere to aluminum foil even after crumpling. This adhesion, plus the high gloss and complete colorability of Buton resins, opens up many opportunities in aluminum coatings. In addition, Buton resins offer:

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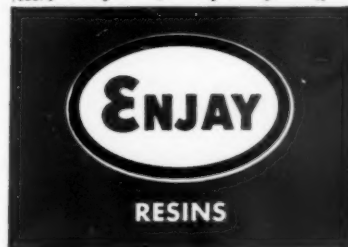


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PAINT AND VARNISH PRODUCTION, June 1961



ALKYD RESINS -- RECENT TRENDS

Part IV

Use of Fatty Acids, Fatty Oils and Non-Fatty Acids in Alkyd Manufacture

FATTY ACIDS

The use of vegetable oil fatty acids has been well established in the protective coatings industry for many years. Actually, a large industry producing many hundreds of millions of pounds of refined fatty acids per year has arisen in part to supply this need.

To be sure, fatty acids are used in alkyd formulation to a considerably lesser extent than oils, in large measure because the use of oils is frequently more economical. Fatty acids, on the other hand, are said to have certain advantages over oils in that they provide greater uniformity and make for easier processing, for the alcoholysis to a monoglyceride, required when oils are used, is eliminated. Thus, when fatty acids are used, a one-step direct esterification is possible with the net result that processing time is shorter and the overall operation is simpler. Also, fatty acid manufacturers point out that the alcoholysis step may provide variable results since there is no really good test to indicate the exact degree to which alcoholysis has occurred. This variation may lead to subsequent variation in the properties of the final alkyd.

Advantages

Fatty acid producers make much of the fact that their products which are produced in modern distillation or crystallization equipment are considerably more uniform than oils which are subject to seasonal and geographic variation. Also, highly refined fatty acids with good color stability provide higher quality alkyds. Furthermore, fatty acids allow for greater flexibility of formulation since alkyds prepared from oils must necessarily contain the amount of glycerol present in the oil. When alkyds are prepared from fatty acids, on the other hand, there are no limitations on the polyhydric alcohol used which may, if one desires, be entirely pentaerythritol.

Disadvantages

As already indicated, the chief disadvantage of fatty

acids is raw material cost, for generally the cost of the fatty acid plus glycerol is greater than the cost of oil. This situation, however, has been changed somewhat by the introduction of low cost tall oil fatty acids. On the other hand, the low cost of the tall oil acids has driven the cost of soybean oil lower and thus, once again, one sees the intricate economic balances which result from technological accomplishments.

Another disadvantage of fatty acids is that bulk handling equipment is more expensive than it is for oils since the equipment must necessarily be acid resistant.

Statistics

Some of the statistics relating to fatty acid usage in alkyds are of interest. In the unsaturated area it is estimated that 33 million pounds of unsaturated fatty acids were used in alkyd resin production in 1957. This was somewhat lower than the 36.6 million pounds consumed in 1955. This 33 million pounds, however, represents a large percentage of the 42.6 million pounds of unsaturated vegetable acids consumed in all industrial uses in 1957. These figures, incidentally, do not include tall oil acids which will be treated separately. In addition to unsaturated acids, coconut acids are used, particularly in baking alkyds. It is interesting to note that total vegetable acids, including coconut acids, consumed in alkyds in 1957 was only nineteen per cent of total alkyd production. This figure, however, has risen slowly but steadily since 1950 when it was 5.4 per cent. These figures give some indication of the relative importance of fatty acids and oils in the alkyd industry.

Another way to present these figures is to indicate that in 1956, 35 million pounds of unsaturated vegetable acids were used in the production of alkyds whereas a total of approximately 470 million pounds of alkyd resins were produced.

Tall Oil Acids

The decline in the use of unsaturated vegetable oil acids is indicated by the above figures for 1957, as compared to 1955, was in part due to the advent of tall oil acids. Tall oil of course is a by-product of the Kraft paper industry and is a crude mixture of rosin acids and fatty acids. Technology has advanced rapidly in the past few years so that the tall oil can be refined and separated by fractional distillation into a pure rosin fraction and a pure unsaturated fatty acid fraction.

These fatty acids comprise approximately equal percentages of oleic and linoleic acids with small amounts of rosin, unsaponifiables, and saturated acids. It is estimated that approximately one billion pounds of tall oil were produced in 1958. Since this material sells in the range of 2.5 to 4.0 cents per pound and contains approximately 50 per cent fatty acids, it is obviously an important source of inexpensive, unsaturated acids for use in alkyd resins. From the raw material point of view, tall oil is exceeded as a source of vegetable fatty acids only by soybean and cottonseed oil and competes for third place with linseed oil. (*Chemical and Engineering News*, November 19, 1956, p. 5752).

In the United States today, there is capacity for producing well over 200 million pounds per year of tall oil fatty acids. This is indeed a major consideration since total fatty acid production is of the order of 500 million pounds per year.

An article in *Chemical and Engineering News* (October 19, 1959, p. 36) also points out some interesting current statistics relative to tall oil fatty acids. For example, tall oil fatty acid production in 1955 was approximately 47 million pounds. By 1958 this had increased to 111 million pounds. This article estimates current tall oil fractionation capacity based on crude tall oil input at 692 million pounds. When expansions now underway will be completed, this fractionation capacity would have increased to 804 million pounds.

Late in 1959 price reduction of high grade tall oil acids was announced and these are now available at less than ten cents per pound, with one company quoting 7.75 cents per pound in tank cars for a product containing 1.5 per cent rosin and two per cent unsaponifiables. A typical high grade tall oil acid will contain between one to two per cent each of rosin acids, unsaponifiables, and saturated acids. Linoleic acid content will be something over 50 per cent. The color of the material will be two on the Gardner scale and the acids will have an iodine number of approximately 130.

Tall Oil-Alkyd Formulation

Formulation with tall oil acids is relatively simple. A typical formulation for a short oil alkyd might include 127 parts of tall oil acids, 73 parts of pentaerythritol, 60 parts of diethylene glycol, and 145 parts of phthalic anhydride. As indicated above, isophthalic acid is believed to be of considerable utility in combination with tall oil fatty acids. Thus, a typical alkyd with a 53 per cent oil length might be prepared from 498 parts of tall oil fatty acids, 108 parts of pentaerythritol, 58 parts of ethylene glycol, 71 parts of

1,2-propylene glycol, 379 parts of isophthalic acid, and 0.6 of litharge.

The importance of isophthalic acid in making possible use of tall oil fatty acids in alkyds is described in an article by Carlston [*American Paint Journal*, September 16, 1957, p. 50].

Important in the utilization of tall oil acids, which initially provided compositions with greater tack than the unsaturated vegetable fatty acids, is the processing procedure employed. One solution to the problem has been to use procedures which give high molecular weight linear polymers. This process has been discussed in numerous places in the literature [Kraft, W. M. et al., Paper presented at Vehicle Manufacturers Group, New York Paint, Varnish and Lacquer Association, New York, March 13 (1957); Chicago Paint and Varnish Production Club, American Paint Journal Convention Daily, Saturday, October 24, 1959].

This procedure for cooking alkyds involves the formation of a higher proportion of high molecular weight fractions than is normally obtained. This higher molecular weight may be achieved by stepwise esterification by the procedure of reacting all the polyol and all the dibasic acids with only a part of the fatty acids. This mixture is esterified to a low acid number after which the remainder of the fatty acids are added and the mixture is cooked further to a low acid number.

This technique is said to provide higher viscosity alkyds as might be expected from a higher molecular weight and also alkyds which are frequently lighter in color. Drying rates and alkali resistance are improved so that long oil alkyds made by this method, particularly with tall oil acids, dry in reasonable times. Better flexibility, adhesion, and freedom from discoloration on baking as well as improved detergent resistance are plus factors which are claimed. Hardness, on the other hand, is comparable to similar properties in alkyds prepared by conventional methods. Thus, this procedure is said to overcome the main defect of tall oil acids in alkyd processing—that of slow dry.

High Polymer Technique

A very recent study on the so-called high polymer technique for alkyd preparation has been published by the Chicago Paint and Varnish Production Club (*The Official Digest*, November, 1959, p. 1364). In this work, four types of alkyds, non-oil architectural pentaerythritol alkyds; medium-oil glycerol alkyds; medium-oil pentaerythritol-ethylene glycol alkyds; and medium-oil trimethylolethane alkyds were studied with various fatty acids. The authors conclude from their work that their data tend to support the contention that the high polymer technique for preparing alkyds makes possible the use of lower grade acids such as tall oil acids in order to obtain compositions reasonably similar to those based on soybean oil. The greatest improvement is apparently in long oil architectural enamels.

Other Studies

A correlation between the properties of alkyd resins and the composition of the modifying fatty acids has

been discussed by Moore [*Industrial and Engineering Chemistry*, **43**, 2348 (1951)].

In the area of saturated acids, coconut acids and the more highly fractionated lauric acid are well established for use in baking alkyds. Other unsaturated acids, such as castor oil acids, are also used. Non-drying alkyds from the much less expensive tallow acids are discussed in an article in *Paint and Varnish Production* by Schwartz and Lutz (November, 1955, p. 35).

Pelargonic acid which is a nine carbon, monobasic saturated acid resulting from the oxidation of oleic acid has also been suggested by its producer for use in baking alkyd resins. Advantages claimed are in the areas of better color, color retention, gloss and gloss retention. Hardness, alkali resistance and resistance to dirt pick-up are also improved.

The use of heptanoic acid in alkyd resin formulation, particularly for short oil alkyds which are to be used with urea resins, has been discussed by Chatfield [*Paint, Oil and Colour Journal*, **127**, 153 (1959)].

In summary, the most important technological change in the fatty acid picture recently, relative to alkyd resins, has been the advent of the tall oil fatty acids. These are now so inexpensive that it is doubtful that other materials will arise to compete with them. Thus, in the future, one may expect minor improvements in fatty acid quality but very little in the way of strikingly new raw materials.

FATTY OILS

Soybean Oil

As indicated above, the alkyd industry has made possible utilization of semi-drying oils, particularly soybean oil, because of the greater functionality inherent in the alkyd structure. Thus, soybean oil has become a well-established component of alkyds for at least two reasons. One of these is that it does not cause the alkyd to yellow as does linseed oil because it has a very low content of linolenic acid. Also, soybean oil has traditionally been inexpensive. Other oils, to be sure, have been useful in alkyds, particularly oils like linseed oil and tung oil where very hard, rapid drying finishes are required and where yellowing is not a problem. But, by and large, soybean oil has been the "darling" of the alkyd industry.

Soybean oil's dominant position has been threatened recently by the tall oil acids discussed above, strictly on a price basis. Soybean oil, however, has met the economic challenge and its producers have lowered the price of soybean oil accordingly.

Thus, as is the case with acids, one cannot expect a great deal of new technology from the oil industry in the next few years, in large measure because oil producers profits are currently at a very low ebb.

Safflower

One interesting new material, however, which has become available in the past few years is safflower oil. This oil is composed largely of linoleic acid and thus it provides a high degree of drying capacity to a finished formulation.

The use of safflower oil in alkyd resins has been discussed by Thurmond, Hempel, and Marling [*Journal of American Oil Chemists' Society*, **28**, 354 (1951)].

Also available is methyl linoleate prepared by methanolysis of safflower oil. Methyl linoleate prepared in this way has approximately 73 per cent of linoleic acid. Its use in alkyd resins has been suggested in formulations of which the following is typical: 448 parts of methyl linoleate, 108 parts of pentaerythritol, and 100 parts of phthalic anhydride. The alcoholysis step is necessary here just as is the case when oils are used.

Other Oils

A variety of other oils has been proposed for use in alkyd resins. Thus, the application of oiticica oil has been discussed by Pollini [*Ind. vernice* (Milan) **3**, 193 (1949)]. Grapeseed oil in alkyd resins has been discussed by Mueller [*Farbe u. Lack*, **57**, 240 (1951)].

A comparison of linseed oil, safflower oil, tobacco seed oil, and coconut oil in alkyd resins containing not more than 35 per cent phthalic anhydride has been described by Kapur and Sarin [*J. Sci. Ind. Research*, (India) **10B**, 94 (1951)].

NON-FATTY ACIDS

Important to the alkyd resin formulator, particularly for the synthesis for short oil alkyds, are chain stopping acids which are monocarboxylic. These are frequently aromatic acids such as benzoic acid and accordingly fall into a different category than fatty acids. Typical of the products available is *p*-tert-butylbenzoic acid. This material is said to provide compositions which dry faster and require shorter baking times than similar compositions employing benzoic acid. Primarily, however, its virtue is said to be the tertiary butyl group which imparts increased hydrocarbon solubility and better color stability.

Of great interest in this regard is an article by Heinrich, Berry, Christian and Mueller which was presented at the April 1959 American Chemical Society meeting. In this article the authors have attempted to define the effect of various possible substituents on the phenyl ring of benzoic acid as related to the performance of the compounds in short oil alkyd resins.

This work indicates that almost any monobasic aromatic acid, when properly formulated, improves the film characteristics of alkyd resins. However, the degree of improvement is to a large measure dependent on the alkyl substituent of the modifying acid. Thus practically all of the substituted benzoic acids which they tested were superior to benzoic acid itself and the best product of all was a bicyclic compound, diphenylcarboxylic acid. Also, the authors found that aromatic character is necessary because hydrogenation of the aromatic ring destroys its effectiveness.

In addition to the diphenylcarboxylic acid, a variety of substituted benzoic acids were effective and their effectiveness increased in the following order: benzoic, toluic, isopropylbenzoic, *p*-tertiary butylbenzoic, and dimethylbenzoic acids. In the latter group, two compounds were tested. These were 2,4-dimethylbenzoic, and 2,5-dimethylbenzoic acid. It is interesting to note that the 2,4 isomer was superior to the 2,5 product.

Work of this sort indicates that there is room for a great deal of research in the areas of fine points of alkyd formulation. One can expect to hear a great deal more about work of this sort in the years to come.

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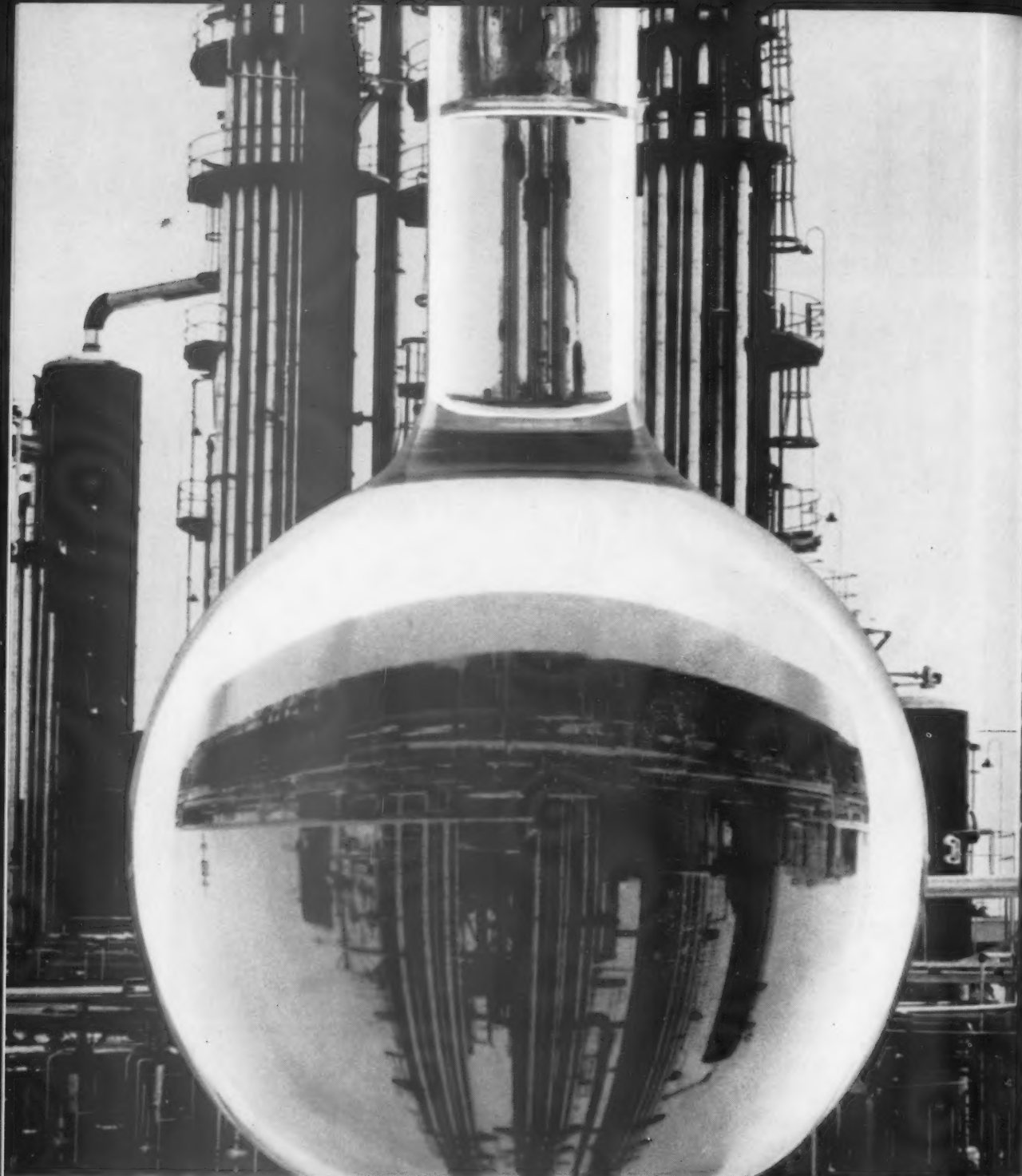
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Another point, MIAK has a mild ester-like odor, much more pleasant than the characteristic odor of the higher ketone solvents.

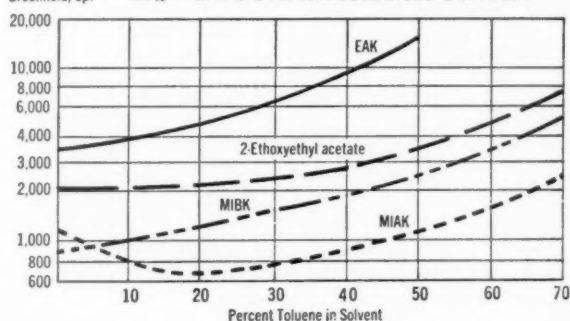
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**Comparison of Solvent Power
of MIAK with Other Solvents**

Viscosity, cps. @ 25° C.

Solvent	Evaporation Rate	10% 1/2 Sec. R.S. Nitrocellulose	10% Half-Second Butyrate	20% Acryloid B-82 Resin	20% VYHH Copolymer
MIBK	1.6	30	23	15	138
n-Butyl Acetate	1.0	44	36	26	GEL
MIAK	0.55	44	33	21	168
Ethyl Amyl Ketone	0.3	86	Ins.	28	286
2-Ethoxyethyl Acetate	0.2	122	68	50	Ins.

**Effect of Toluene on the Viscosity of
20% R. S. 1/2 Sec. Nitrocellulose Solutions**



MIAK

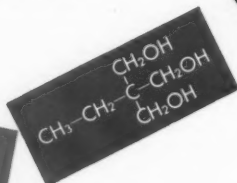
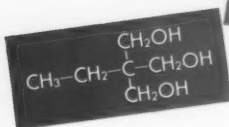
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By
Edward Anthony

The author expresses his random reflections on various aspects of the paint industry. The opinions contained in this column are his alone and do not necessarily reflect those of this publication.

Selling Ourselves

WHEN it comes to advertising—and the sales results to be obtained therefrom—I must admit that the paint industry just might be able to learn a thing or two from the purveyors of soap, detergents, et al. Consider if you will the problem produced by the combination of, one, overly dirty clothes, two, an over-stuffed washing machine, and three, an over-worked Mommy. The result inevitably is clothes that are not washed completely clean. It is the particular solution to this problem that presents an intriguing approach to satisfying consumer desires.

Oh, the family could change its clothes more often, or the designers could concoct a more efficient (and abrasive) agitator for their machine, or cleansing agents of even

greater activity could be developed. None of these! Capturing his customers' imagination, an agent was introduced into the soap or detergent recipe which absorbed the energy of the sun, transmuting it into whiter and brighter clothes! Of course, these fluorescing chemicals didn't actually *clean* the fabric any better but they *appeared* to do so. They satisfied a need. Their use illustrates specifically and graphically the *marketing approach* to sales: make products do what people want, not just what you want to manufacture.

As usual, this story of "tattle-tale gray" can be absorbed and utilized to advantage by our industry. A tremendous amount of good scientific effort has been expended in developing paints which do almost the same thing—but our public is

not fully conscious of either this work or the fine results. Our tattle-tale gray problem comes from *mildew*. Fungi can turn a home's beautifully gleaming paint job into a dull, dirty coating.

This microbiologic deterioration can be overcome for both water-based and organic solvent soluble formulations. A low bow of appreciation is also in order for the efficient bactericides which have been developed to prevent spoilage in the container of latex paints which have grown so rapidly in importance. Thus, preservation methods are available for both wet and dry paints—on the shelf and on the home.

But let's tell this story. It is a tale of success—not 100 per cent, but enough so that the results to the user will be gratifying.

How can finishes be made resistant to attacks of this sort? There are formulative approaches which help to prevent mildew. For example, harder vehicles are superior to softer ones; heavy chalking paints are better than their chalk-resistant counterparts—they are, in a sense, self-cleansing; the inclusion of zinc oxide is believed to help promote mildew resistance. There are numerous additives which can be put into the paint, either by the manufacturer or by the consumer himself. Among others, phenyl mercuric salts, copper 8-quinolinolate, and tetra-chlorophenol have found favor. The numerous articles published in the various technical journals attest to the past and continuing activity in this field. Representative of the writings which have appeared in the *Official Digest* are "Fungus and Fungicides" by C. C. Yeager (October 1954), "Inhibition of Mildew on Protective Coatings" by D. Hunt Jr. (September 1953), "Deterioration of Protective Coatings Due to Molds and Bacteria," a bibliographic study by the Chicago Club (November 1956), and the seven papers on the topic "Microorganisms in Relation to Organic Coatings" presented in the April 1958 issue.

The presence of high humidity and moisture accentuates the growth of mildew. The sunny side of the street—in addition to presenting an interesting personal philosophy in

the old song of that title—goes a long way toward helping to prevent mildew. Many different microflora have been found eating their way through our paint films; the types vary not only by geographical location of the finished structure but also whether the surface is interior or exterior. Further, the variety is influenced by the use of the structure—home, industry, office, etc. Deterioration is often associated with weak spots in the paint film: cracks, drip areas, thin film thickness, and so forth. The nutrition offered by dirt particles plays an important role in the activity of these spores.

Work has been done; much has been learned (and remains to be discovered, too); deterents have been searched out which minimize—and in many instances, completely suppress—this undesirable growth. Now let us take advantage of the results of the scientific approach in a promotional manner. Contractors and home owners, industrial maintenance supervisors and building managers—alert them all to the fact that we have something they not only need but *want*. We can further enhance the *decorative* aspects of the surface coatings they use and at the same time improve the *protective* qualities. And they will save money in the long run (a really convincing argument)! More to the point, these additives *solve a problem*. They represent *customer orientation*; *marketing* at its most influential best.

Micro Sounds

YOU would hardly think that the techniques used to explore the character of the crust of the earth could be turned from such macro phenomena and be made applicable to such a lightweight subject as the spinning of a spider's web. It is true however that the same "geophones" used by Dr. C. H. Dix (a CalTech geophysicist) to reveal the structure of the crust by sounding techniques—similar to the methods employed in the seismic detection of oil—can also pick up truly minimal sounds.

What piqued my interest was the thought that perhaps this fantastically sensitive listening device might possibly be employed to hear the noise of monomers in the pro-

cess of polymerizing, of oils oxidizing, of solvents evaporating, of films relieving their stresses. Now, are you aroused, too?

Chemists are People

SOMETHING like the automobile, it does seem as if the computer is here to stay. I keep expecting to wake up any day and read that monorail construction has finally started in one of our big cities, minimizing the import of Mr. Ford's commuter's nightmare, and in a like manner maybe *people* will, in the distant future, replace the machine! But probably not soon.

The other day a local press re-

lease briefly described how a Shell Oil Company team had developed a system of logic by which an electronic computer can design a chemical plant better than a staff of trained engineers. With bitter irony this method is called CHEOPS—"chemical engineering optimization system." Checking into my ancient history textbook I noted that the builder of the Great Pyramid almost bankrupted Egypt four thousand years ago because he had to utilize practically every able-bodied person in his memorabilia construction force. And now his name-sake—a machine—can do a better job than the very men who built it! (I must admit at this

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point that I chuckled deeper and longer at Bob Newhart's machine-firing-another-machine monologue than at any other of his wondrously amusing stories.)

A recent Department of Labor salary survey, reported in *Chemical and Engineering News* (Dec. 12, 1960), includes a detailed job classification description for six levels of professional responsibility of chemists. At the top, "A chemist VI decides the kinds of projects and data needed to meet planned objectives and directs the work of other chemists so as to meet the objectives. He represents the laboratory at conferences and has the

authority to speak for it." Know any computers who can do all that?—and get \$250 per week (the median salary for this group).

This survey, which covered remuneration received during the winter of '59-'60, indicated that attorneys, mathematicians, accountants and engineers holding positions of comparable responsibility earned higher salaries than did the chemists. Draftsmen and auditors were paid less. Most of the technical personnel employed in the paint industry have received their educational background in chemistry or engineering. Those who specialized in the latter discipline received

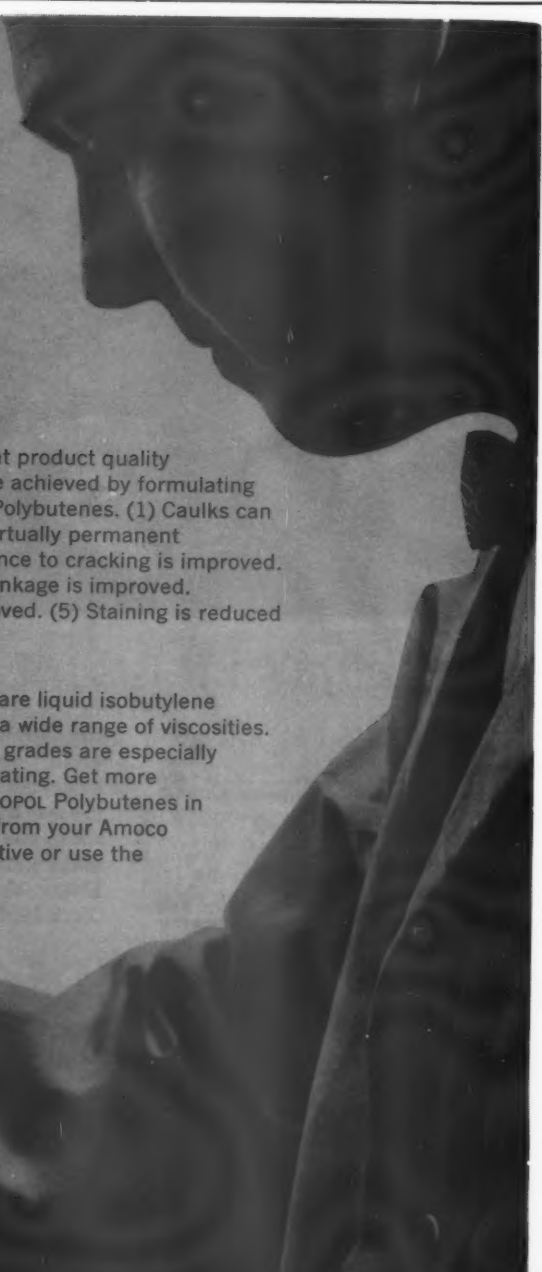
about \$20 per week more than their chemistry confreres according to the survey. This differential exists through all six of the categories described.

In addition to the top level category described in detail above, here are the interestingly varied delineations for the lower five groups: "A chemist I is an inexperienced beginner with a bachelor's degree who performs routine tasks under close supervision and, typically, is getting. . . on-the-job training. A chemist II gets instructions from his supervisor. . . but independently selects and applies the method to be used. A chemist III's work requires specialized knowledge plus the ingenuity and experience to develop details of an assignment. A chemist IV plans and does experiments that require mastery of specialized techniques, . . . interprets results, . . . may supervise a small staff of chemists and technicians. A chemist V participates in planning research programs on the basis of his specialized knowledge of problems, methods, and probably value of results. He carries out research requiring both original techniques and mature background in other fields of science."

It is worth noting that Research and Development Directors—the men who boss even the level VI people—earn about \$100 per week more (\$350) than their subordinates.

Compared with the weekly earnings of production workers, these figures once again underscore the growing economic importance of a college education. As reported by the Bureau of Labor Statistics, the nation's average is about \$91 per week, through in such states as California the average is almost \$15 per week higher. These sums indicate average income; what about the outgo? A recent Gallup Poll inquiry reveals the *minimum* amount considered necessary to "get along" by an American family of four is about \$84 per week—with a range of from \$66 in the South to \$104 in the fast-growing Far West. This over-all average is \$30 greater than ten years ago.

If you think things are tough now wait 'til those computers start figuring out how much *they* think *we* should receive!



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Dr. Joseph J. Mattiello



COVER STORY

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Jordan 13th Mattiello Lecturer

DR. LOUIS ARNOLD JORDAN, an outstanding international authority on decorative and protective coatings technology, will present the 1961 Joseph J. Mattiello Memorial Lecture at the 39th Annual Meeting of the Federation to be held in Washington, D. C., from November 2-4.

Dr. Jordan has disclosed that the provisional title of his lecture will be "Science and Society—Master or Servant."

The Mattiello Memorial Lecture, instituted by the Federation in 1949, commemorates the name of Dr. Joseph J. Mattiello, who, as a member of the Federation, did so much to expand the application of the science in the decorative and protective coatings field. Dr. Jordan is the thirteenth outstanding scientist to receive one of the paint industry's highest honors—selection as a Mattiello Lecturer. Previous Lecturers were: Roy H. Kienle (1949); Theodore F. Bradley (1950); Donald H. Wheeler (1951); John R. MacGregor (1952); Adolf C. Elm (1953); James S. Long (1954); Herman F. Mark (1955); Maurice Van Loo (1956); Albert C. Zettlemoyer (1957); Eugene G. Rochow (1958); Vincent C. Vesce (1959); and Henry Fleming Payne (1960).

Dr. Jordan is the Founder Director of the Paint Research Station, Teddington, England, and of the Research Association of British Paint, Colour and Varnish Manufacturers. Recently he was Chair-

man of the Committee of Directors of Research Associations.

From school he went as a Royal Scholar to the Royal College of Science, an integral part of London University. Twice he was a Governor's Scholar (a distinction not previously achieved by anyone).

In 1918, he joined Boots Pure Drug Co. and became Works Manager of its Chemical Division. In 1920, he joined the British Xylonite Co. to start an investigation which resulted in the establishment of the British synthetic camphor industry.

From 1923-1926, Dr. Jordan served in India as the Scientific Adviser to the State of Bhopal. In 1955 he returned to India for four months at the invitation of the Government of India to enquire into matters touching the developments of the lac industries, to examine the research potential of the Indian Lac Research Institute, and to make recommendations likely to promote the utilization of lac with special reference to the coatings industries.

Since January 1958, Dr. Jordan has been Professor of Chemistry at the Royal Academy of Art, London—an exceptional honor.

Dr. Jordan intends to touch upon topics falling within the ambit of development of the science and the practical art of paint technology.

Many practical arts stem from earliest times but the

story of the making and using of paint is unique seeing that it is of the fabric of which history is made—indeed of some peoples there is but little history save in their painted record.

In one way or another leaders of society and governments have now learned that they must understand something of the potential of modern scientific method and the implications, both material and political, of the things likely to flow from it.

In commenting on the modern period of our technology, with its ever-accelerating tempo and majestic catalogue of notable events from, say, the nitrocellulose breakthrough after World War I, through the blossoming of the macromolecule to the water-thinnable and non-thinnable finishes of today, Dr. Jordan notes that this, the 13th year from Mattiello, almost covers one-third of the modern period.



Dr. Louis A. Jordan

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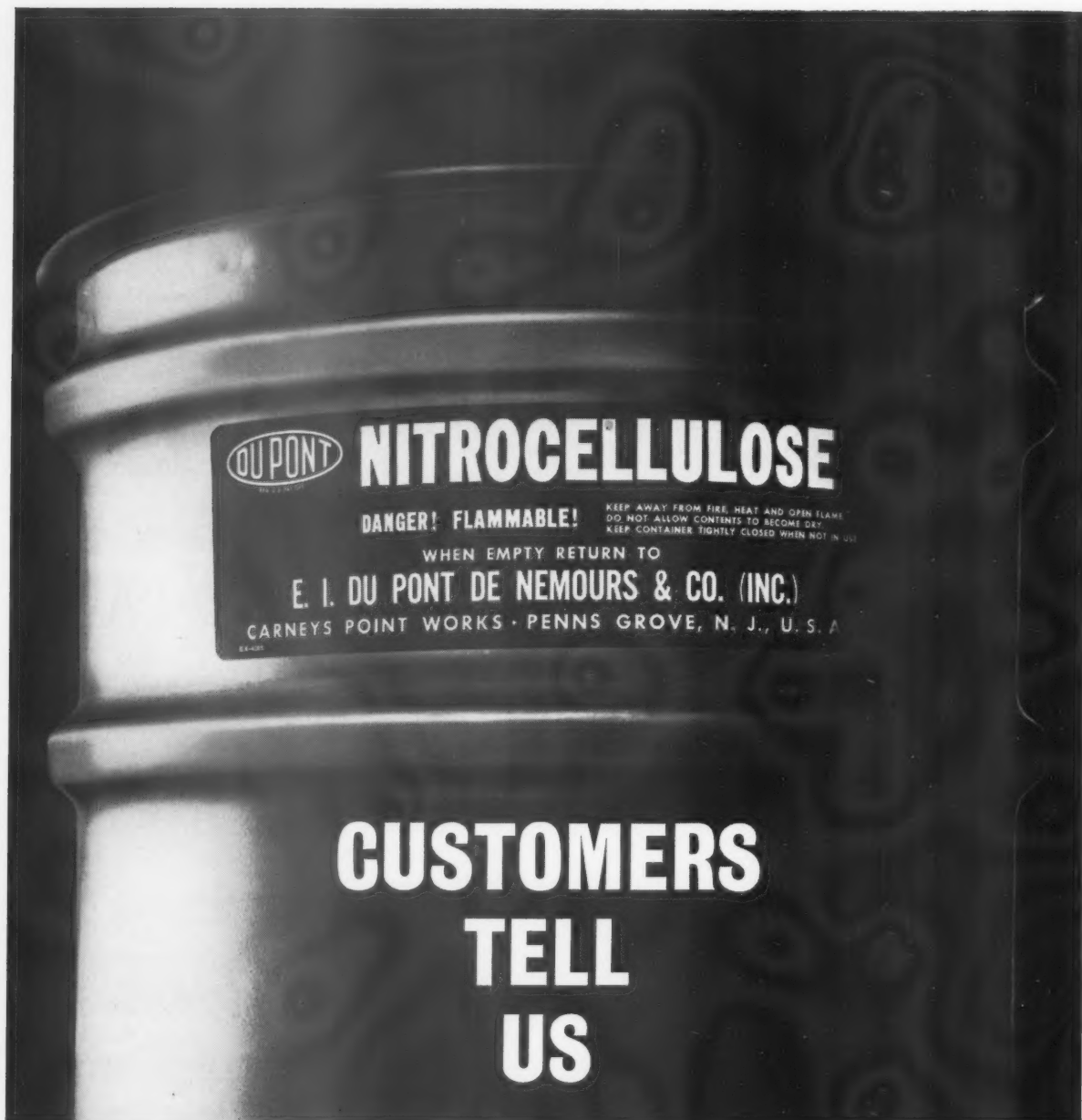


Send me data on: ☐ HET[®] Acid ☐ Alkyl acid phosphates ☐ Benzoic acid ☐ Chlorinated paraffins ☐ MPS-500[®] ☐ Tetrapotassium pyrophosphate ☐ Niagathal[®] ☐ Trichlorethylene ☐ Triphenyl phosphite ☐ Phenolic resins ☐ Caustic soda ☐ Caustic potash ☐ Carbonate of potash.

Name..... Title.....

Company..... Address.....

City..... Zone..... State.....



CUSTOMERS TELL US

that with Du Pont Dense Nitrocellulose, they save money.

This is reflected in savings on shipping, storage and handling costs with every drum of Du Pont Dense Nitrocellulose that arrives on warehouse docks.

Lower labor costs result because you handle fewer drums in the mix room and each drum empties fast.

If you'd like to learn more about the economics of this nitrocellulose, call your Du Pont Explosives Department representative or write: Du Pont, 2446 Nemours Building, Wilmington 98, Delaware.

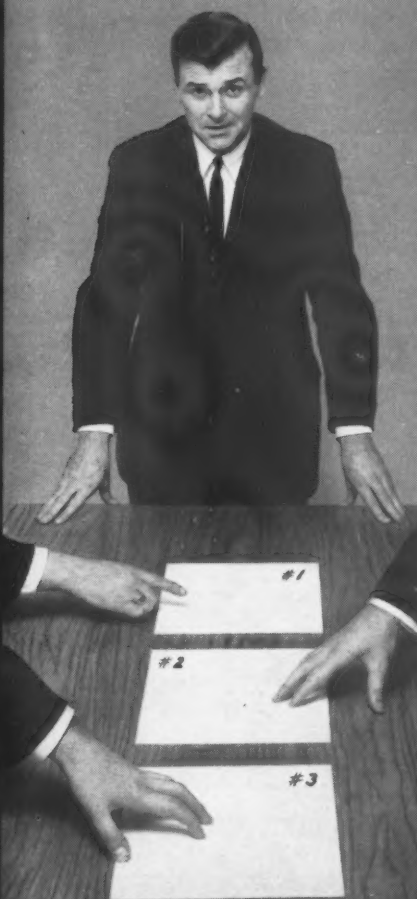


**DENSE
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Better Things for Better Living...through Chemistry

Better from VELSICOL

Your
Velsicol
Representative
can tell you...



**There's more money
in masonry paint now
that Velsicol W-617
resins are here!**

THIS 2 YEAR TEST PROVES IT!

Three formulations of Masonry Paint were prepared as follows:

1. A control formulation of the original paint.
2. A formulation with a 10% replacement of the original vehicle with Velsicol W-617 resin.
3. A formulation with a 25% replacement of the original vehicle with Velsicol W-617 resin.

The masonry paints were applied to asbestos shingles in two coats. Two panels of each paint were placed on exposure in Florida and Ohio. After two years exposure in both locations the paints on all three panels are in excellent condition! These test panels were exposed to tropical sun, salt air, rain, snow, sub zero temperatures and the analysis of a cost accountant. The facts are apparent; Velsicol W-617 resins save money in masonry paint formulations without compromising quality. WRITE NOW FOR TECHNICAL DATA AND TEST SAMPLES so that you can learn first hand how to make more money on your masonry paint products.

Work with this man . . .

*Your Velsicol representative,
a qualified chemist who can help
you make better products for less!*



FREE

W-617
test
samples
and
literature

VELSICOL CHEMICAL CORPORATION, 330 E. Grand Ave., Chicago 11, Ill.
INTERNATIONAL REPRESENTATIVE: VELSICOL INTERNATIONAL CORPORATION, C.A.
P.O. BOX 1687 • NASSAU, BAHAMAS, B.W.I.

- ☐ Please send test samples of Velsicol W-617 Hydrocarbon Resins.
☐ Please send complete technical data. ☐ Have representative call.

NAME _____
COMPANY _____
ADDRESS _____
CITY _____ ZONE _____ STATE _____

VELSICOL



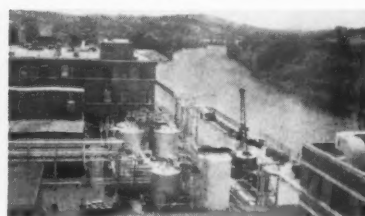
"Shawinigan's GELVA Emulsions meet our strictest raw material requirements."

Successful paint manufacturers like Indianapolis Paint and Color know there is no substitute for really dependable raw materials. That's why they rely on GELVA Emulsions to help provide superior paint properties, including—

- outstanding brushability and leveling.
- excellent stability and high resistance to sun, heat, rain and salt air.
- color uniformity, non-ghosting, good hiding, absence of lap marks, water spot resistance and good holdout.

Shawinigan Resins offers more than quality products to the paint manufacturer. Technical assistance from Shawinigan's surface coatings specialists is always available to help in any aspect of a customer's paint manufacturing problems. Real assistance in formulating just the right polyvinyl acetate paint—whether it is homopolymer or copolymer—is a Shawinigan specialty. Write today for further information. Shawinigan Resins Corporation, Department 4P Springfield 1, Massachusetts.

PLANNING, RESEARCH, MANUFACTURE—Shawinigan's extensive facilities and broad experience in the paint field benefit customers throughout the world.



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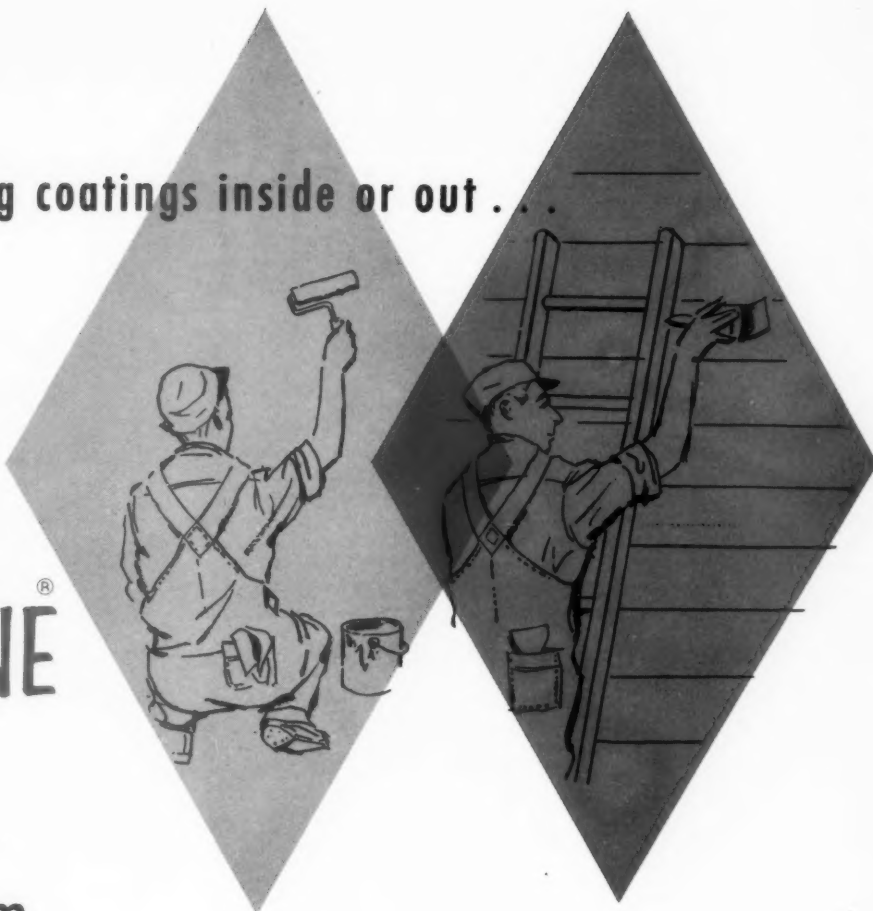
GELVA® Emulsions for paints by



For outstanding coatings inside or out . . .

USE
ASBESTINE[®]
525

"tailored"
Magnesium
Silicate!



Whether you make oil-base and/or water emulsion exterior formulations or interior paints such as alkyd or water emulsion flat, semi-gloss or low-sheen paints, you should know about ASBESTINE 525. Newest addition to our broad line, this outstanding extender offers paint chemists high flattening efficiency, high oil absorption and improved film integrity in an intermediate price range.

"Tailored" from high grade, "platey" ore by our unique precision milling process, ASBESTINE 525 is a chemically inert, stir-in pigment with excellent wetting and suspension properties and good white color. It produces tough paint films with good adhesion and improved sanding prop-

erties and is excellent for building thixotropy into formulations.

International Talc, world's largest producer of talc and leader in talc research, offers the paint industry an ASBESTINE grade perfect for every requirement. All are available for prompt delivery from ample stocks conveniently located throughout the U.S.A. and Canada. Money-saving combination shipments are available by combining our grades.

For samples and complete technical information on ASBESTINE 525 or other grades in our full and diversified line, contact us today.

ASBESTINE 525 Typical Physical Characteristics

Average Particle Size	5.2 microns
Hegman Fineness (obtained by hand mixing in linseed oil)	4-4½
Oil Absorption (Gardner-Coleman)	53-58
Water Absorption (cc's per 100 grams)	150-200
KU Range (Oil-base Paint Test Formula)	95-110



Only Producer of ASBESTINE
INTERNATIONAL TALC CO., INC.
WORLD'S LARGEST PRODUCER OF TALC
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A PATTERN FOR PROGRESS...

These brochures make good reading for resin and coatings manufacturers who've had trouble getting enough maleic anhydride to meet their needs. Good news, too, for those who'd like to get all four major intermediates — maleic, fumaric, benzoic and pentaerythritol — from one dependable supplier.

Heyden's new plants, at Fords and Garfield, New Jersey, have an annual production capacity of 24-million pounds of maleic anhydride, 8-million pounds of white free-flowing technical powder

fumaric acid and 12-million pounds of benzoic acid in technical flakes. Heyden offers maleic in the molten state and in 25-gram briquettes which combine the advantages of less dusting and less moisture-absorbing surface.

Complete data on physical and chemical properties of these intermediates are available in the brochures illustrated. Just write Heyden Chemical Division for your copies.

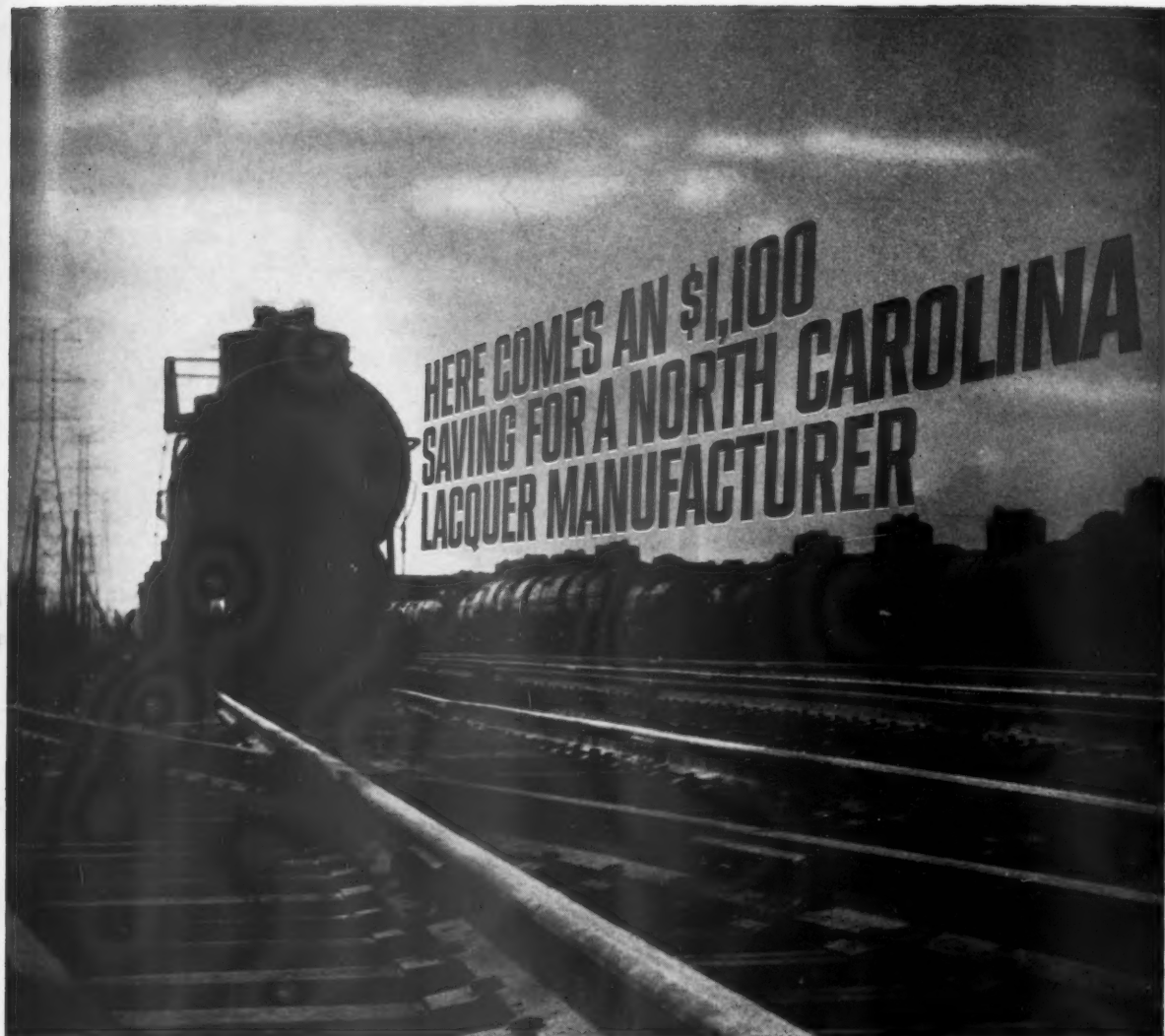
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HEYDEN

ORGANIC CHEMICALS FOR INDUSTRY
CHEMICAL DIVISION
 342 MADISON AVE., NEW YORK 17, N. Y.



HEYDEN NEWPORT CHEMICAL CORPORATION



He switched from n-butyl acetate to **Eastman ISOBUTYL ACETATE** and is saving 14¢ per gallon. That's more than \$1,100 for an 8,000-gallon tank car.

Lacquer makers everywhere are finding it easy and profitable to switch to Eastman Isobutyl Acetate for their medium-boiling solvent needs. It can be used interchangeably with n-butyl acetate in most lacquer formulations. In nitrocellulose lacquers, for example, it produces no significant change in film properties or application characteristics.

Eastman Isobutyl Acetate can often be used as a replacement for methyl isobutyl ketone at a saving of 5¢ per gallon.

Or, use it to simplify your formulating by eliminating solvent blends and save money in the process. The cost per gallon of Eastman Isobutyl Acetate will probably be less, for example, than the cost of blends of n-butyl acetate with sec-butyl acetate or n-propyl acetate.

Ask your Eastman representative to show you how a switch to Isobutyl Acetate can lower the solvent costs of your present lacquer formulas.

Eastman
CHEMICAL PRODUCTS, INC.

Subsidiary of Eastman Kodak Company, KINGSPORT, TENNESSEE

SALES OFFICES: Eastman Chemical Products, Inc., Kingsport, Tennessee; Atlanta; Boston; Buffalo; Chicago; Cincinnati; Cleveland; Detroit; Greenboro, N. C.; Houston; Kansas City, Mo.; New York City; Philadelphia; St. Louis. **WESTERN SALES REPRESENTATIVE:** Wilson & Geo. Meyer Company, San Francisco; Los Angeles; Portland; Salt Lake City; Seattle.

IN PRODUCTION EQUIPMENT FOR Paint & Varnish

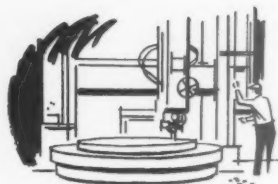
important progressive changes are under way at . . .



Research! Every product line from the Conaform dryers to the smallest mixing equipment is being thoroughly researched, and analyzed to produce a better piece of equipment for the lowest possible cost. Lower burden helps reduce your price, but better engineering is producing a better product.



Design! Experienced designers are busy creating a new look, a new form, a new serviceability in the Patterson Line of products for industry.



Mechanization! Thousands of dollars are being poured into new equipment, new facilities to enable Patterson to comfortably produce a mixer, a group of processing equipment, or an entire production facility. Before you buy, be sure to check the savings you'll get at Patterson.



Efficiency! New work standards, automatic machinery, new equipment means greater efficiency — better work flow — better delivery. The important changes under way at Patterson mean big savings and better processing equipment for you!

Yes, Patterson is rapidly becoming one of America's leading sources of processing equipment for the Paint & Varnish industry. In every department men are busy with welding torches, milling machines, chip-removal machines, building the finest equipment possible at really great savings. *Regardless of your previous practices it will pay to discuss your program with Patterson's engineer-trained sales representatives.*

THE *Patterson* FOUNDRY AND MACHINE COMPANY
East Liverpool, Ohio, U. S. A.

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The Patterson Foundry and Machine Company, (Canada) Limited
Toronto, Canada — Montreal

Patterson

FOUNDRY AND MACHINE COMPANY



BASIC KETTLE SYSTEMS

FOR VARIED PRODUCT MIXES

Shown is the highly versatile Patterson Dowtherm Kettle System at the Westinghouse Benolite plant. Included in this typical installation is a 1500 gallon reactor with fume stack, reflux and decanter system. Temperature is controlled automatically, regulating the flow of Dowtherm vapor to the 2-zone jacket. This unit indicates the capability of Patterson in engineering and building resin systems of all types and sizes. Patterson also builds electrically heated, direct fired, Aroclor, and hot oil or steam systems.

TURN THE PAGE

FOR MORE INFORMATION

Patterson Foundry & Machine Company

Gentlemen:

Please arrange to contact us about a _____

NAME _____

TITLE _____

COMPANY _____

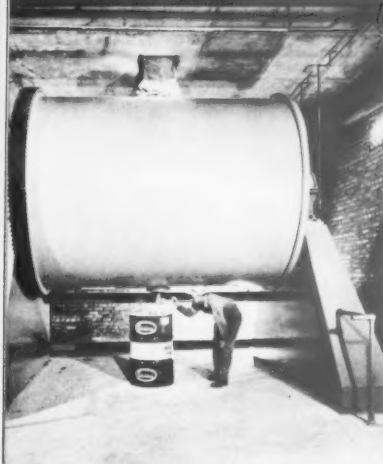
CITY _____ STATE _____

Current Production at

Patterson

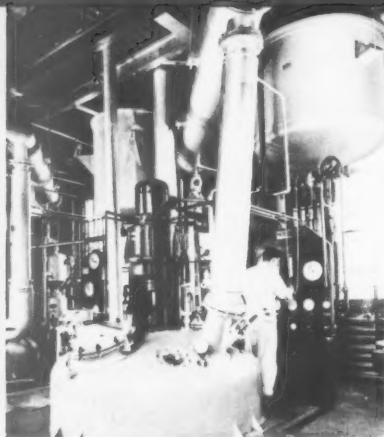
FOUNDRY AND MACHINE COMPANY

for the Paint & Varnish Industry



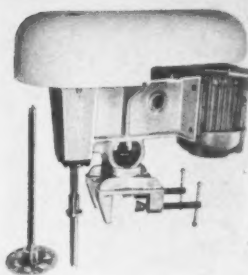
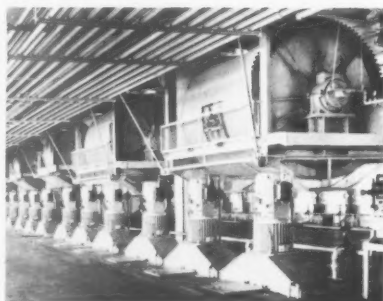
Patterson's Famous For Grinding Mills

Patterson is the only company in the world building a complete line of batch type and continuous feed ball, tube, and pebble mills of all types and sizes. Typical of those in operation are illustrated above, and are in the production lines at Glidden Paint Company at Cleveland. These mills are used to grind all types of paints, varnishes, enamels and paper coatings and other industrial products. Your choice of Patterson equipment insures you lasting quality, dependable year after year operation!



Ceramics for Grinding Media and Lining Blocks

Patterson offers immediate delivery on all types of mill linings and grinding media. A choice of "Arlcite" or "Porox" mill and tank linings and grinding media materials is a guarantee of quality and satisfaction.



Wizard Portable Variable Speed Agitator

Power as you want it from a fixed speed motor — AT THE TURN OF A HANDLE! This new mixer outdates any model now on the market. It's light! It's compact! Provides up to 50% more horsepower than any competitive unit at this price! A new chuck system with a quick release allows for easy removal of the shaft and impeller from the agitator unit for use time after time without cleaning! Write for complete brochure! Ready now for immediate shipment from stock. Also the all new 5 hp Wizard, priced far below others — nothing like it; an entirely new design!

Grinding Mills In addition to the usual ball mills found on the production floor of America's leading paint manufacturers, the Patterson name is to be found on thousands of installations where grinding is a part of the production program. A typical installation is the one shown where the plant has used these mills almost continuously since their installation more than 40 years ago. Patterson is the word for grinding mills in the Paint and Varnish field . . . none finer!

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Patterson Foundry & Machine Company

East Liverpool, Ohio

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to express
our thanks . . . the
first 100 will receive
a fine ball point pen with
a draftsman point!

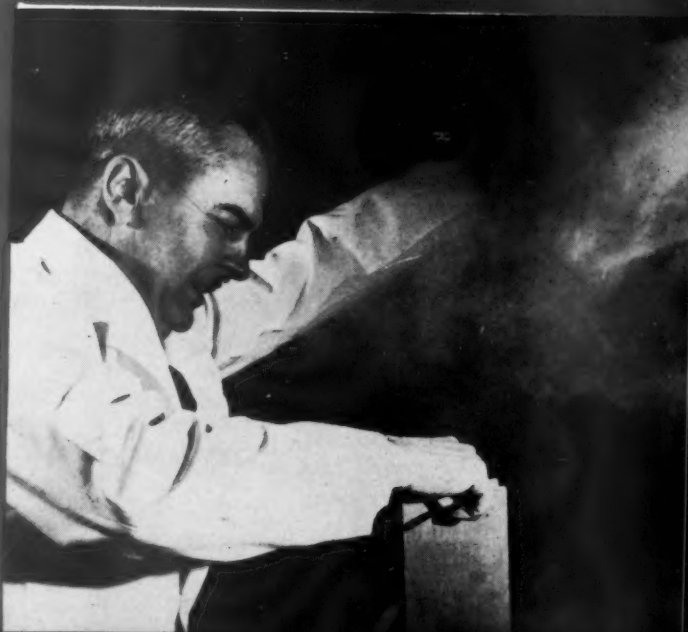
PRODUCTION

PACKAGING

MATERIAL
HANDLING

NEW EQUIPMENT
and MATERIALS

One hundred hours of continuous exposure to a 20 per cent salt spray caused no rust, corrosion or other harmful deterioration to metal coated with a new synthetic rubber latex metal primer developed by Goodyear Chemical Div., discussed on page 75.





PAINT PACKAGING PROBLEMS? GET CROWN IN THE PICTURE!

For "doubletite" paint cans to protect your oil base paints, for the latest latex cans with the improved rust resistant features to protect your water base paints, for a complete "F" style line for allied products—call on Crown.

Crown has facilities to give you complete, efficient service together with the finest quality in cans. In fact, Crown has a fast-moving service department.

For all your canning needs, call on Crown.



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cans • crowns • closures • machinery

9300 Ashton Rd., Philadelphia 36, Pa.

Managerial Aspects of Marketing

By
Lawrence Shatkin*

I BELIEVE everyone would agree that the "Customer is King," and as such, a shift in company policy is necessary. The total marketing concept, with its customer-oriented approach makes it necessary that all of the functional segments of an organization be coordinated to support this shift in attitude. The sales manager focuses his attention on the needs of the buyer rather than on the needs of the seller. The production manager becomes marketing-oriented and is eager to accept challenges in manufacturing the products demanded by the consumer. He is receptive to such items as latex paints, latex floor enamels, epoxies, urethanes and any coating that is marketable at a profit.

This new marketing concept makes sales volume subordinate to profitable volume, and seriously questions the value of "deals" and "gimmicks" as a means for increasing sales volume. Continued long-term growth will come about through technological and marketing innovations, and through a projected view of introducing new products. The rate of failure for the successful commercialization of new products runs approximately eighty percent, and this failure means a drain on manpower, money, machines and materials.

The new marketing concept calls for complete integration and effective communication throughout the organization. This means an

understanding of people, a dynamic organization, managerial controls for action, and competent managers whose thinking is focused upward.

Product Planning

The responsibility for new product planning must be instituted before any program of product development can be implemented. This means that objectives and goals must be established which are customer-oriented. This concept denotes that one has to explore the strengths and weaknesses of an organization, and see that these strengths overcome whatever weaknesses may be present. One must attempt to quantify as many factors in product planning as possible. There are times when this will be very difficult to do, especially with such features as rating the market ability of a new product, its growth potential, durability and merchandisability. Nevertheless, we must take advantage of any experiences, exposures and information that are available.

Professor Hector Lazo, Area Chairman in the Department of Marketing at the Graduate School of Business Administration of New York University stated that it is possible to estimate one's market twenty years ahead.¹ In asking yourself what is the market for consumer goods, certain basic elements stand out. This involves people, with a need for the particular product, and with sufficient

disposable income. These three elements can be augmented by referring to the "Survey of Buying Power" and compiling statistical information on such characteristics as population, size, distribution, shifts, trends, effective buying income, who has it, how much, buying pattern, what they buy to satisfy their wants, and many other data. When this information is properly assembled, it will enable you to forecast with some degree of intelligence, and if you can ascertain a trend, you will have achieved, to some degree, the power to predict.

Marketing Research

The marketing manager must use all of the tools comprising the "marketing mix." The traditional approach to marketing research is the application of scientific methods to gather and interpret all facts relating to the transfer and sales of goods and services. This includes market and sales analysis, consumer surveys, and any other quantitative study involving statistical design. This information is desired because every business has to make marketing decisions in an atmosphere of uncertainty. The analysis of such information allows a company to move strategically in such areas as new product development, improved product design, new channels of distributions, different media selection, pricing decisions, etc.

We have to be careful that our day to day pressures do not cause

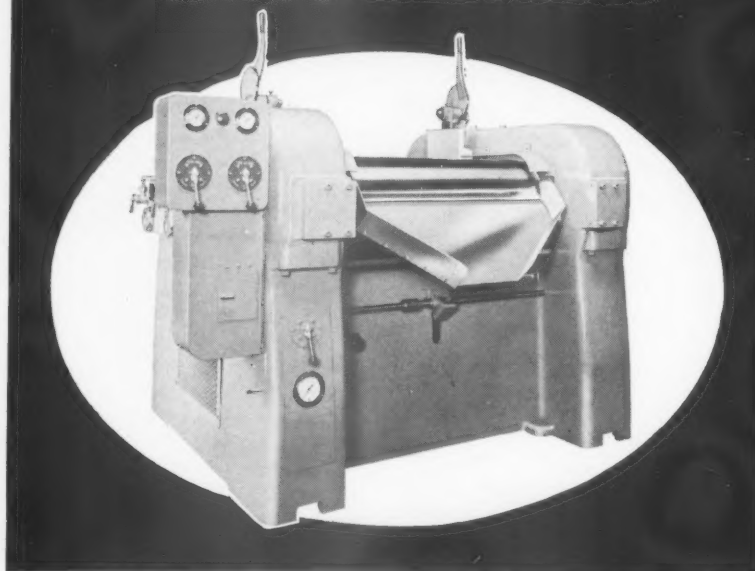
Opinions expressed in this feature are not necessarily those of any particular firm or organization.

1. Lazo, Hector, "How to Figure 20 Years Ahead." Sales Management, April 4, 1959.

New LEHMANN

MODEL 583 AH PAINT MILL

--another long step
toward automation



This is the most highly mechanized mill that has yet been designed. Control points have been reduced from four to two. The machine has an electric hydraulic pressure system, push button actuated. A control cabinet located on the frame contains roll pressure gauges which indicate total roll pressure for each adjustable roll.

By positioning the control valves the machine will operate with the "floating roll" principle or with independent roll pressures. The system is completely wired at our factory, requiring in addition only the installation of a 110 volt single phase line to the machine. These ultra-modern mills are available in all the popular roll sizes.

Take the first step toward reducing your paint milling costs — send for complete information on the Model 583 AH Paint Mill.



J.M. LEHMANN COMPANY, Inc.

550 NEW YORK AVENUE, LYNDHURST, N. J.

marketing research efforts to go out of phase. We must not become preoccupied with details and must avoid rigidity in our ways of doing things. We must learn to allocate our efforts where they will help us complete our projects that will bring us closer to company objectives.

Motivation Research

During the past ten years, the behavioral sciences have been applied to the fields of management and marketing. The psychological techniques used to find out why a consumer exhibits certain buying patterns is referred to as motivation research. Freudian methodology underlies the techniques used in current motivation research. These researchers try to penetrate the conscious level and uncover motives at the subconscious level which make the consumer react in such a way without his being aware of it. The challenge of these researchers is to have the consumer evolve an image of the product that is consonant with his own personality or "cultural matrix."

Pricing

The concept of pricing is complex, full of legislative action, and of universal interest because it impinges on everyone's pocketbook. Different levels of value are involved in pricing, some of which are real, and some of which are subjective. There are many factors to consider in the costing and pricing of a new product.

A "skimming" price strategy calls for an initial high price that will capture that part of the market that does not place major emphasis on price. The product is different and allows one to take this move.

"Penetration" pricing is often adopted when the product does not command an advantageous position, and this type of pricing tends to prevent the threat of new competitors.

The marketing concept implies a team effort covering all phases of an organization. It starts and ends with the customer and requires a big shift in attitude. This new concept makes us profit conscious rather than volume conscious. It requires a management that is product or market oriented, capable of coordinating these activities with the balance of the company.

Greater Capacity — Maximum Flexibility in LIMITED SPACE **"U.S." Long-Roll JAR MILLS**



Special Features:

- 1 Three-position adjustment handles jars 2" to 15" in diameter.
- 2 Free-turning, ball-bearing jar stops.
- 3 Lifetime lubricated and sealed bearings.

HANDY HINTS ON JAR MILLING

If bending or breaking jar lid locking bars constitute a problem, check for hardening of the gaskets. Should be soft enough to indent with fingernail (about 30 Durometer).

For additional helpful grinding and mixing data, plus full details on "U.S." Jar Mills, WRITE FOR BULLETIN JM-290.

"U.S." Long-Roll Jar Mills are specially engineered to make most efficient use of valuable floor space. Their greater capacity and flexibility make it possible to expand substantially your milling facilities within virtually the same floor area as occupied by other models.

These units have sturdy welded steel frames built for long, dependable service under rigorous operating conditions. The 3" di-

ameter parallel-ground rollers are made of long-wearing chemical- and solvent-resistant Neoprene rubber. Heavy-duty motors and drives assure ample power.

FULL RANGE OF SIZES — Available with two or three rolls; single or multiple tiers; roll lengths from 16" to 72". Wide choice of optional equipment including cabinets, casters, automatic timers, tachometers, clutches and variable speed drives.

PROCESS EQUIPMENT DIVISION

U. S. STONEWARE
AKRON 9, OHIO

403-G

PAINT AND VARNISH PRODUCTION, June 1961

69

Important news for users of 2-gallon pails —

Milton introduces the TINSTEEL pail, a major breakthrough in pail production—one which cuts your handling costs, slashes dealer returns and helps boost your sales!

WHAT makes new, Milton 2-gallon TINSTEEL pails so special? Several important things:

1. Milton TINSTEEL pails are made of heavy gauge *tin-plate*. This eliminates the possibility of coating flaws inside or outside the pail. Spoilage is reduced.

Another factor in this regard is TINSTEEL pails' 12-lug covers. They fit each pail tightly. This, plus minimal "head-space," reduces the possibility of skinning.

2. Because they are made of tin-plate, Milton TINSTEEL pails can be lined with the same material that has proved so successful in gallon and quart cans used for emulsion paints.

3. Thanks to special machinery, new, TINSTEEL pails come in a range of sales-attracting colors! (Left uncoated, tin-plated TINSTEEL pails stay bright, fresh-looking, attractive.)

4. TINSTEEL pails come to you packed in the same type of kraft paper bags which have proved so practical over the years for packing smaller sized paint cans. Net

result? Empty, TINSTEEL pails are handled and stacked as easily as smaller paint cans.

5. Another factor recommending Milton 2-gallon TINSTEEL pails is their unusual strength. The heavy gauge steel under their bright tin-plate makes them enduringly rugged.

Also, Milton TINSTEEL pails have *straight* sides. This gives them *vertical* strength, makes them resistive to waste caused by damage in handling and stacking.

6. Because production varies seasonally, many successful firms prefer to hold materials stocks to a minimum, ordering additional items as needed.

You can follow this profitable practice secure in the knowledge that fully automatic equipment enables Milton to deliver all the 2-gallon TINSTEEL pails you're likely to need to keep production flowing smoothly. (Milton can now turn out enough TINSTEEL pails daily to meet the total requirements of *all* users!)

Of course, there are other advantages, too, in buying 2-gallon TINSTEEL pails—and smaller sized cans—from Milton. Consider these:

Milton service is quick. Often you receive delivery within 24 hours after you call.

Milton 2-gallon TINSTEEL pails are available for shipment with other can sizes in mixed carload and truckload lots or almost any fraction thereof.

Milton containers are moved from the carrier into your plant on dollies. This mobilizes receiving and speeds unloading time. The entire operation proceeds with minimum use of your manpower. Dollies are left in your plant until the next Milton delivery; this facilitates movement of cans from storage point to production line. Again, both time and labor are saved. (This service is available within trucking radius of New York City.)

For all these advantages, Milton TINSTEEL pails are competitively priced.

Whether you presently use 2-gallon pails, or may someday, find out more about the superior, new kind Milton makes. And for all types of cans—lined, unlined, plain, lithographed, standard and made-to-order, enjoy the time-saving, dollar-saving advantages of dealing with Milton. A trial order will convince you. Call today. EVERgreen 3-1100.

GEORGE A. MILTON CAN CO., INC.



131 North 14th Street
Brooklyn 11, N. Y.
Our 34th Year

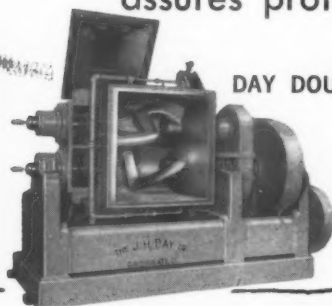


For your processing needs...

advanced **DAY** equipment

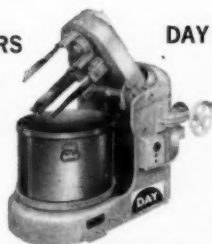
assures profitable performance!

for
Mixing



DAY DOUBLE ARM MIXERS

Can't be beat for heavy-duty mixing of viscous fluids and semi-solids. Many types and capacities.



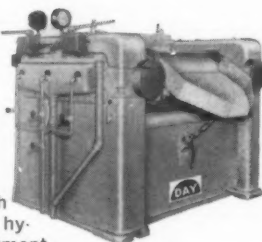
DAY PONY MIXERS

Are the peak of design for all change-can mixing of liquids, pastes, granulations. Single and twin motion models.

for
Milling

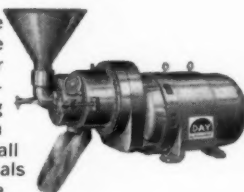
DAY 3-ROLL MILLS

Unsurpassed for fine dispersions of paints, inks, plastisols, ointments and many other heavy pastes and similar materials. Production and laboratory models with screw-type or advanced hydraulic roll pressure adjustment.

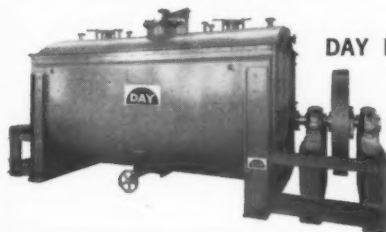


DAY HY-R-SPEED MILLS

They are the choice of the industry for grinding, homogenizing and blending, in one operation, all types of materials flowing or paste.

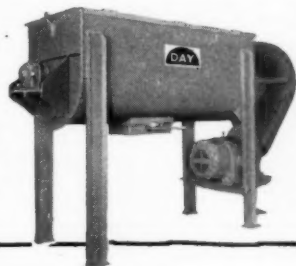


for
Blending



DAY RIBBON BLENDERS

Produce perfect mixing of powders, pastes and liquids. The line is complete—light, medium, and heavy-duty designs.



for
Sifting

DAY RO-BALL SIFTERS

With super-active ball cleaners, insure fast, thorough sifting of wet or dry materials. Models for 2, 3, 4 or 5 separations.



CONSULT WITH DAY ON YOUR PROCESSING REQUIREMENTS

Follow the lead of other major chemical processors and specify DAY equipment—accepted the world over for efficient, economical, dependable service. There is a DAY design that will meet your exact requirements for mixing, milling, blending and sifting operations. For detailed information on DAY equipment, call in a J. H. Day Company field engineer.

See our catalog in
Chemical Engineering Catalog.

USE THE DAY CUSTOMER SERVICE LABORATORY



Our completely equipped laboratory, and staff of skilled technicians, are at your service to help you determine the best method of processing your product. This complete service is available without obligation.

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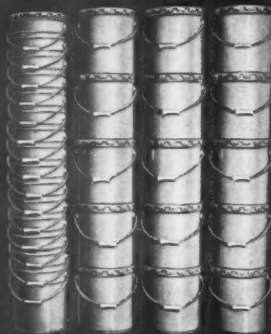
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Submersion-Heated Kettle Provides Formulation Versatility

PAINT makers these days must be versatile. It used to be that all you needed was some linseed oil, red or white lead and turpentine and you were in business.

Today you must be able to shift from one formulation to another up and down a formulation roster as nimbly as a jazz pianist on his keyboard. Most of the ingredients of paints and finishes made today you wouldn't even have heard of ten years ago—acrylic resins, styrene-butadiene, epoxys, dimethylsiloxane, polyvinyl acetate—just to name a few.

In order to keep up in this fast-moving business a paint manufacturer must have the equipment required to produce all these different types of paints. Yet it's not practical to have separate equipment for each different formulation.

The Armstrong Paint & Varnish Works has been able to work out a compromise between continuous operation and what sometimes amounts to custom formulation.

In its Varnish Division, for example, Armstrong installed more than ten years ago a kettle for processing paint vehicles which has established some sort of record for versatility and performance.

This kettle, known around the plant as No. 5 Still, was the first production model equipped with electric submersion heaters and Dowtherm A, the heat transfer medium manufactured by The

Dow Chemical Company. Since May of 1949, when No. 5 Still went into full-scale operation, until this year almost 2,800 batches have been chalked up on its operating charts.

During those ten years it was necessary to remove the heat transfer medium only three times: once when a sight glass broke (check valves, operating as designed, prevented loss), once when the material was filtered and returned to the kettle, and finally in 1957 when the Dowtherm was removed in order to be reclaimed. By the latter date build-up of soluble high boilers had reached eight per cent and the used material was exchanged for new material upon the recommendation of the manufacturer.

Armstrong's No. 5 Still was custom made by Blaw-Knox. It is of stainless steel-clad construction and has a capacity of about 2,000 gallons. Heat source is a battery of fifteen 30 KW submersion heaters. These heaters are installed in the lower jacket underneath the kettle. The 440 gallons of Dowtherm occupy 14 inches in the jacket; heating is by vaporization.

When Armstrong ordered the kettle in 1949 it was looking for a piece of equipment which could be used for high temperature reactions. The problems were the classical ones of providing uniform temperatures with a maximum of safety.

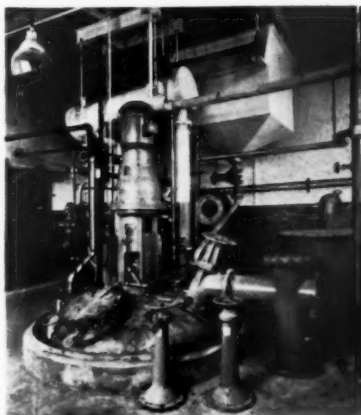
Armstrong has used No. 5 Still chiefly for processing materials

with a low flash point or when lighter colors are indicated.

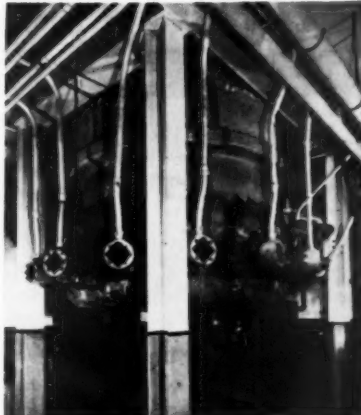
Leo Travis, superintendent of Armstrong's Varnish Division, says that this indirect heated kettle provides uniform reactions which is important in producing vehicles having good color. He further claims that because of the design of the kettle and its components, upkeep costs are kept to a minimum and maximum safety is provided, especially with low-flash materials.

Each two years samples of Dowtherm are analyzed by Dow and a report on impurities and breakdown made to Armstrong. This insures continued high performance of the heat transfer medium.

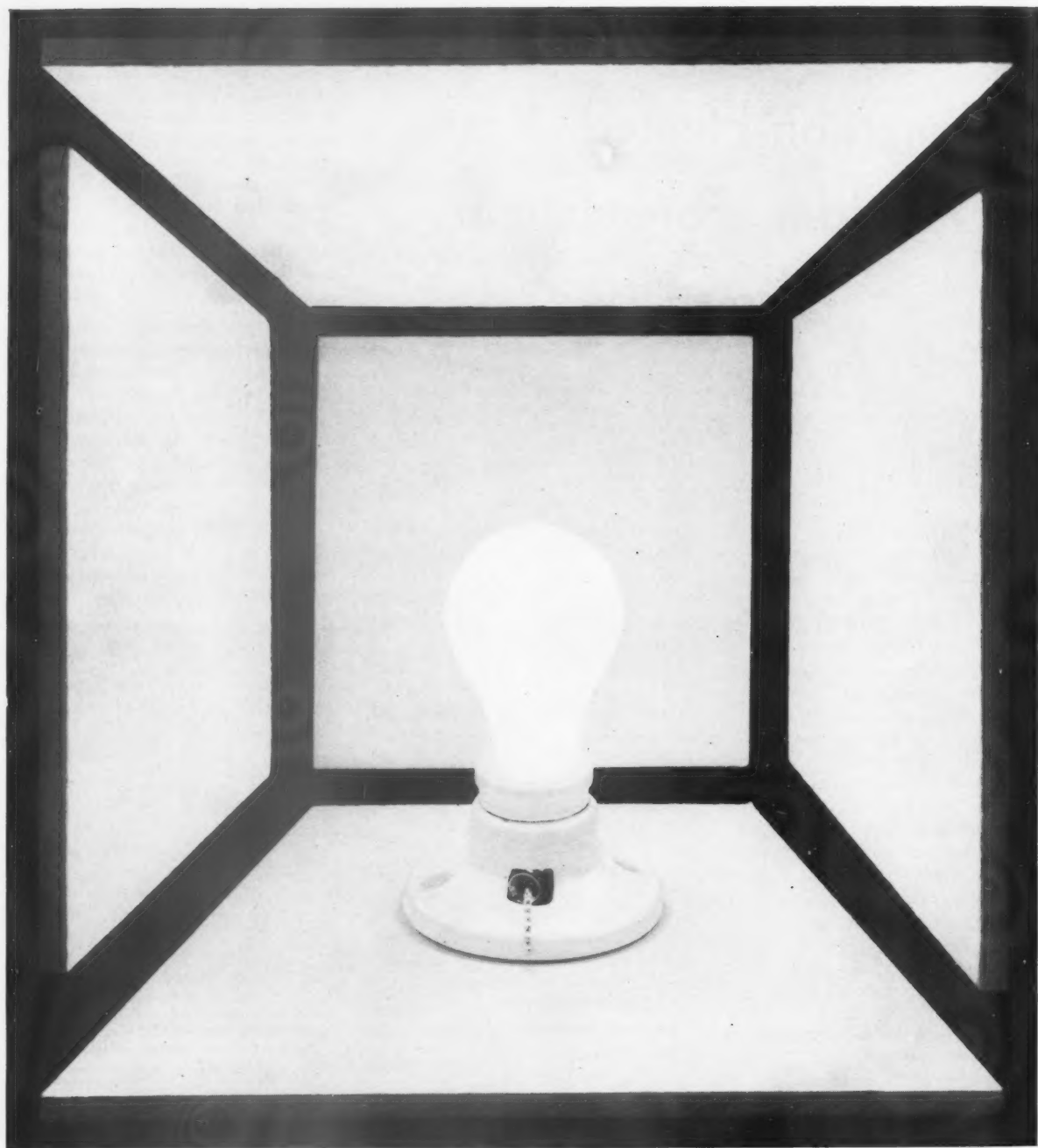
Tavis estimates that No. 5 Still is capable of handling any one of at least 20 different vehicle formulations. With properly designed equipment Armstrong has been able to meet the stepped-up demands of the modern paint industry.



Number 5 Still is equipped to accommodate a wide range of formulations. Of stainless steel-clad construction it has capacity of about 2,000 gallons.



Still is equipped with a battery of 15 electric submersion heaters for heating heat-transfer media.



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By putting the irregular particle shapes of Celite® diatomite to work, formulators are assured of exceptionally high uniformity of flatting as viewed from *any* angle.

Celite particles produce microscopic film roughness, scattering reflected light and providing a dull finish that resists polishing and glossing. Celite's high flatting efficiency provides effective and precise control of low-angle sheen in the full range

from semi-gloss to dead flat. For whatever degree of luster is required within this range, an appropriate Celite grade is available to produce durable paints of uniform appearance.

Get the full Celite story by writing Johns-Manville, Box 14, New York 16, N. Y. In Canada, Port Credit, Ont. Cable address: Johnmanvil.

JOHNS-MANVILLE 

New Developments

Goodyear Develops Synthetic Latex

A new synthetic latex is said to provide a method for controlling excessive corrosion and rust on automobile bodies and other metal surfaces.

Said to be the first of its type ever marketed, the new latex was designed specifically for use as an air dry metal primer for paint applications by the Goodyear Chemical Division.

In addition to automotive applications, the new latex is suggested for use as a primer on structural steel, farm and other implements and vending machines, according to J. E. Warner, Coatings Department Manager.

Rust normally occurs when salt or other corrosive chemicals penetrate the gloss or top coat of paint and attack the metal beneath. It is the job of the primer to resist and ward off these chemical reactions and prevent damaging rust.

Tests show the new latex to have excellent resistance to water and salt spray, Mr. Warner reported. Metals coated with the air dry primer have shown no traces of corrosion, even after 100 hours of continuous exposure to salt spray. Water immersion tests have produced equally good results, he said.

The primer can be applied easily by brush, dip or spray methods and can be top-coated with conventional air dry or baked enamel finishes.

Other advantages of the material, called Pliolite Resin Latex 481-X are excellent adhesion to steel before and after water immersion and good shelf aging of pigmented or colored primers, Mr. Warner said.

The new synthetic is described as a resinous, modified styrene-butadiene latex which will dry to a clear, non-tacky film.

A companion product, Pliolite Resin Latex 480-X, containing a non-staining antioxidant, is sug-

gested for non-paint applications such as textile backings and scrim adhesives for textiles. This new latex, Mr. Warner said, also has excellent mechanical and chemical stability and dries to a resinous, clear, non-tacky film with good aging properties.

G-E Develops Solvent Resistant Silicone Fluids

A new class of nitrile-containing silicone fluids with unique properties has been developed by the Silicone Products Dept. of General Electric Co.

Presence of nitrile groups in the fluids gives them high polarity and results in such properties as solvent resistance, limited electrical conductivity and high dielectric constant. The N. S. fluids are similar to dimethyl silicone fluids in that they have low surface tension.

The unusual properties of N.S. fluids suggest their possible use as non-aqueous antifoams, base stocks for solvent resistant greases and

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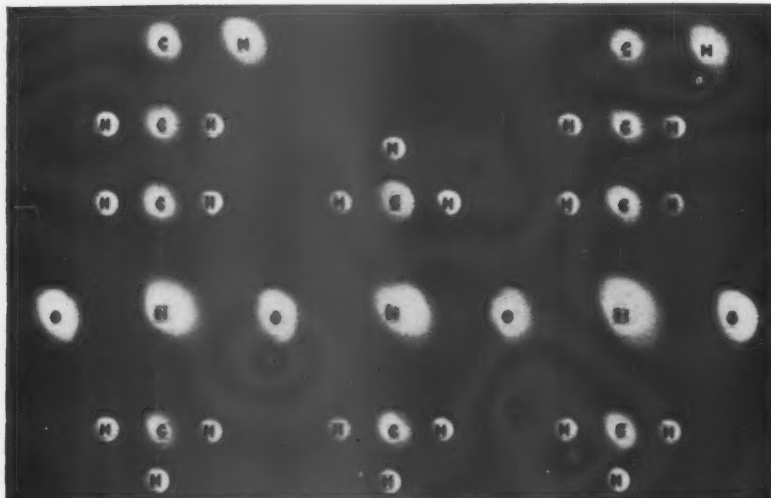
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NITRILE SILICONE FLUIDS—Model of gmolecular structure of N.S. Fluid



OIL RESISTS OIL—New nitrile-containing silicone fluid grade is shown to maintain complete integrity when poured into toluene solvent.

coatings, antistatic agents, as plasticizers and additives for plastics as well as components in polish formulations.

The dielectric constants of N.S. fluids can range from approximately 3-20 at 60 cycles, compared to dielectric constants of standard silicone fluids which are in the range of 2.5—3.0. The high polarity of the nitrile group gives them insolubility in non-polar solvents such as aliphatic and aromatic.

These fluids are soluble in certain polar solvents such as alcohols, ketones and ethers. This type of solubility makes them valuable where oil and solvent resistant fluids or coatings (such as lubricants or greases) are desired. Varying degrees of insolubility in non-polar solvents are possible, depending on the nitrile content of the grade of N.S. fluid selected.

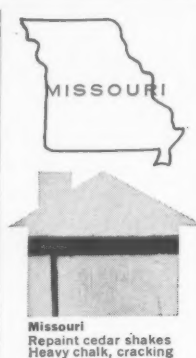
The following characteristics of N.S. fluids have also been noted:

Hydrolytic stability—After 90 hours in boiling distilled water there is no evidence of hydrolysis or decomposition.

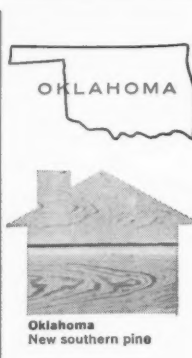
Thermal Stability—Weight loss tests indicate possible usefulness for long periods at operating temperatures of 150°C.

Electrical conductivity—Where normal silicones have a volume resistivity in the range of 10^{13} to 10^{14} ohm-centimeters, N.S. fluids are somewhat more conductive and can be formulated with volume resistivities in the range of 10^9 ohm-centimeters.

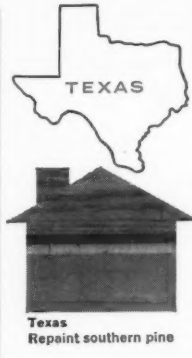
Surface tension—Dimethyl sili-



Missouri
Repaint cedar shakes
Heavy chalk, cracking



Oklahoma
New southern pine



Texas
Repaint southern pine



Minnesota
Reconstituted
factory-primed siding

Task-testing ADM's new vinyl acrylic on the home front...

AROLON 310

Looking for a vehicle that can improve your exterior latex line? Then take a good look at ADM's new vinyl acrylic, AROLOX 310.

As these photographs indicate, we're task-testing AROLOX 310 on homes from L.A. to Newark. On wood, stucco, cement block and cement asbestos shingles. On new construction and repaint substrates. Over various degrees of chalking and cracking. On different woods, including new and repaint southern pine. This is in addition to nearly a thousand panel exposures with a longer history of outstanding performance for AROLOX 310.

Test home results to date—after 18 months in some cases—are excellent. AROLOX 310 definitely offers marked advantages in color acceptance, pigment binding power, and resistance to efflorescence and film deterioration on alkaline materials. Color retention and adhesion are in a class with the best competitive exterior latexes.

Yes, we're taking new AROLOX 310 to task on the home front. We'll keep you posted on results. Meanwhile, we suggest you include it in your own test program.

Contact the ADM representative in your area. He'll keep you up-to-date on our nation-wide test program and give you complete information on new AROLOX 310.

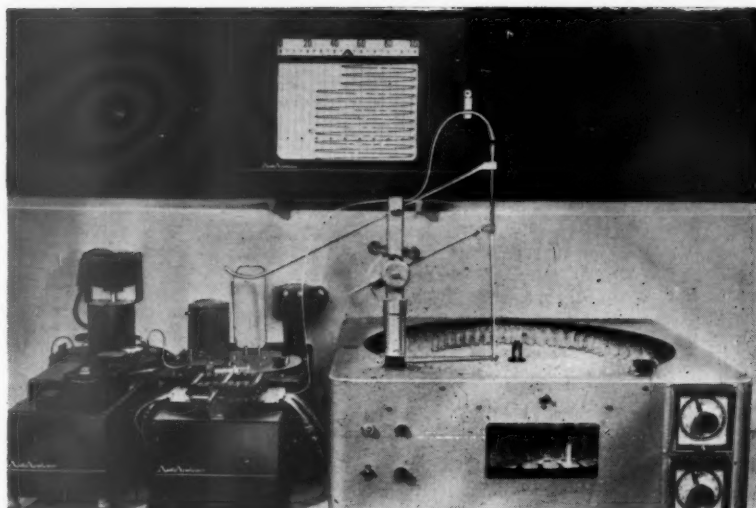
Watch for future AROLOX 310 "Task-Testing On The Home Front" reports.

cones have surface tensions in the order of 21-23 dyne/cm. The surface tensions of the N.S. fluids range between approximately 23-37 dyne/cm.

Toxicity—Preliminary toxicological tests indicate that the cyanoethyl silicone fluids are relatively non-toxic. However, complete information on the toxicological effects of high temperature decomposition products is not available.

Typical physical properties of the N.S. fluids are in the following range:

Nitrile content (-C. .N)—3-23 wt. %
 Viscosity range 25°C —80 to 1,300 csts.
 Refractive index 25°C —1.4105—1.4605
 Flash point —600°F—640°F



Autoanalyzer automates each step of a chemical analysis now done manually.

Modules Extend Applications Of Technicon AutoAnalyzer

Development of a two-speed proportioning pump and an automatic sampler of greater capacity that extend the scope of laboratory applications for the AutoAnalyzer is announced by Technicon Controls, Inc., Research Park, Chaucy, N. Y.

The autoanalyzer, available in laboratory and plant models, is a continuous flow system that automates each step of a chemical analysis now performed manually, including measuring, mixing, purifying, processing, comparing and recording. Because sample size, time, and temperature remain constant, reproducible results can be obtained down to parts per billion with precision of $\pm 1\%$. Since the auto analyzer checks the sample to be analyzed against a continuous stream of standard sample, the process is self-correcting.

Until now automation of laboratory procedures was practical only for large numbers of repetitive tests as each test series required long set up time. With the advent of the autoanalyzer's two-speed proportioning pump, set up time between test series is reduced to as little as one minute.

The two-speed proportioning pump provides the operator with a choice of standard speed or high speed flow equal to $4\frac{1}{2}$ times standard speed. This makes it practical to run as many as 10 or 12 different analyses daily on the same machine with minimum changeover.

MINNESOTA	FLORIDA	NEW JERSEY	CALIFORNIA

Substrates pictured before test painting

Archer-Daniels-Midland
CHEMICAL GROUP
 702 INVESTORS BUILDING
 MINNEAPOLIS 2, MINNESOTA



Safflower oil formulations make all other WHITE house paints look yellow!

Make this positive test! Use Safflower oil as the base for your whitest exterior paint formulation. Compare to your present formula using any other oil base. Result: The Safflower base will produce an extremely brilliant white that makes other "true" whites look yellow or greyed.

Safflower produces a number of other outstanding advantages that will improve your formulations. Here are some of them:

NON-YELLOWING. Safflower paints have high non-yellowing characteristics not found in other oil paint formulations.

BRIGHTER COLORS. Colors pigmented with Safflower oil are brighter and clearer.

SUPERIOR THROUGH-DRY. Quick drying properties allow for recoating in shorter times.

EXCELLENT COVERING PROPERTIES. Plus high wrinkle resistance and dew flattening resistance.

STAND UP BETTER. Five year weather tests prove the durability of Safflower paints is equivalent to highest quality coatings with a linseed oil base.

For further information, write for our new brochure "Safflower Oil House Paints."

PACIFIC VEGETABLE OIL CORP.

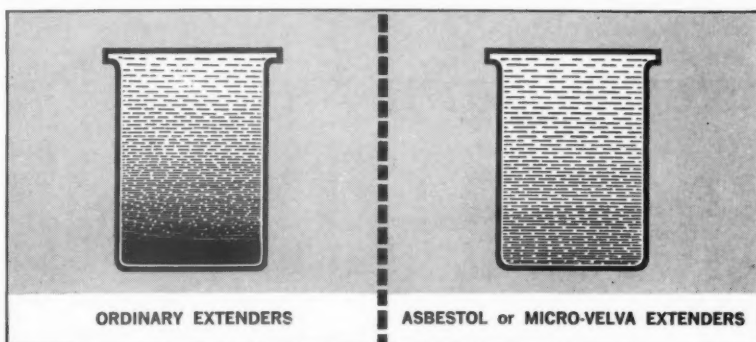
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the exact requirements
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AZO leaded ZINC OXIDES

TYPE	AZO 50-L	AZO 35-L	AZO 35-M	AZO 18-L	AZO 18-L-S	AZO 12-L
	Cofumed	Cofumed	Blended and Acicular	Cofumed and High Basicity	Blended and Acicular	Cofumed
Consistency in Paint	Low	Low	Medium	Low	Medium Low	Low
Specific Gravity	5.95	5.85	5.85	5.75	5.75	5.70
Weight Per Solid Gallon (Pounds)	49.56	48.73	48.73	47.90	47.90	47.48
One Pound Bulks (Gallons)	0.02018	0.02052	0.02052	0.02088	0.02088	0.02106
Per cent Zinc Oxide (Approximate)	50	65	65	82	82	88
Per cent PbSO ₄ -PbO (Approximate)	50	35	35	18	18	12
Per cent Basicity (Expressed as Lead Oxide-PbO)	12-14	6.5-8.5	6.0-7.5	7-7.5	6-7	0.5-1.0
Specifications	ASTM	D80-41	D80-41	D80-41	D80-41	D80-41
	Federal		TT-Z-321a	TT-Z-321a		

The properties you want most in your exterior paints can begin right here . . . with the AZO leaded zinc oxides you need for durability and mildew resistance in your primers and top coats.

AZO cofumed leaded zinc oxides have excellent mixing and dispersion qualities and produce the lowest consistency in paint. AZO blended type leaded zinc oxides generally give higher consistency and improve color. Both types have uniform consistency within grades—help minimize mixing problems in your plant.

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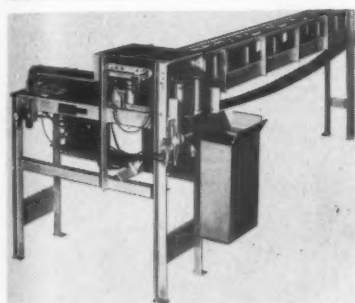
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NEW EQUIPMENT AND MATERIALS

This section is intended to keep our readers informed of new materials and equipment. While every effort is made to include only reputable products, their presence here does not constitute an official endorsement.



FOOD MACHINERY

CASER Semi-Automatic

Continuous, semi-automatic casing of one-gallon paint cans into end-open shipping cases is now a reality, employing the modified Model 10 non-shock, end-open caser. Heretofore, these containers required hand-casing in order to properly position and nest the "ears" that are mounted on opposite sides of the cans for the purpose of attaching wire bails.

Substantial savings can now be realized by reason of the continuous, semi-automatic operation of the caser coupled with the use of the more economical end-open shipping cases. Only one attendant is required to set-up and place the shipping case over the loading tube at speeds of 10 cases a minute (40 cans/minute packed 2 x 2 x 1).

In this application, the caser employs positioning devices that ensure proper orientation and nesting of the cans as they enter the end-open shipping case. Costly damage to ears, cans and labels is eliminated.

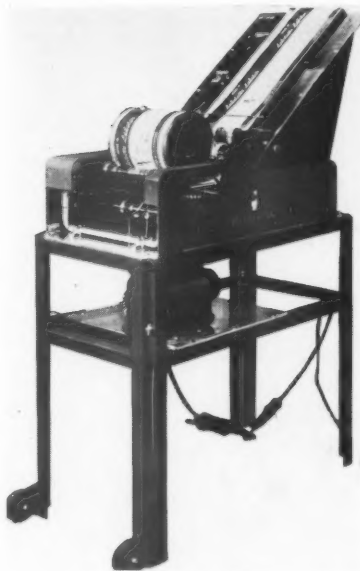
Food Machinery and Chemical Corp., Dept. PVP, Canning

Machinery Div., P.O. Box 1120, San Jose 8, Calif.—No. 00 on Reader Service Cutout.

CAN LABELER Sixteen Cans-Per-Minute

Automatic paint can labeler that can handle up to 16 one-gallon round cans a minute has been developed.

Company officials state that the new machine, designated "Model 14C," is nearly three times as



LABELETTE

fast as hand labeling, and in addition assures accurate label registration, even around can ears.

According to the same sources, it was designed expressly to fill the need for a machine capable of handling intermediate production at an optimum rate three years in development, the Model 14C can affix spot, face or wrap-around labels on half-pints, pints, quarts, and one gallon cans with ears, making it ideal for a variety of labeling operations.

The labeler features a mobile floor stand with casters for easy portability. Operated by one man,

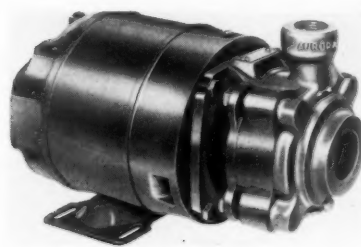
it can be used for steel, tin, glass, plastic or fibre containers. Adjustment for a run of different size cans can be made in just two minutes. Powered by a half-horsepower motor with variable speed control, the Model 14C requires 16 inches by 30 inches of floor space.

Labelette Co., Dept. PVP, 216 S. Jefferson St., Chicago 6, Ill.

CENTRIFUGAL PUMPS Easy Installation

Reduced space requirements and faster easier installation are the outstanding features of the new "packaged line" of close-coupled end-suction centrifugal pumps.

Complete disassembly without disturbing the suction or discharge piping minimizes the effort required for inspection and maintenance. Vertical centerline discharge makes these pumps self-venting, eliminating the possibility of vapor locks and providing smooth running operation with low noise level. Stainless Steel, $\frac{3}{4}$ " in diameter through seal assembly, eliminates

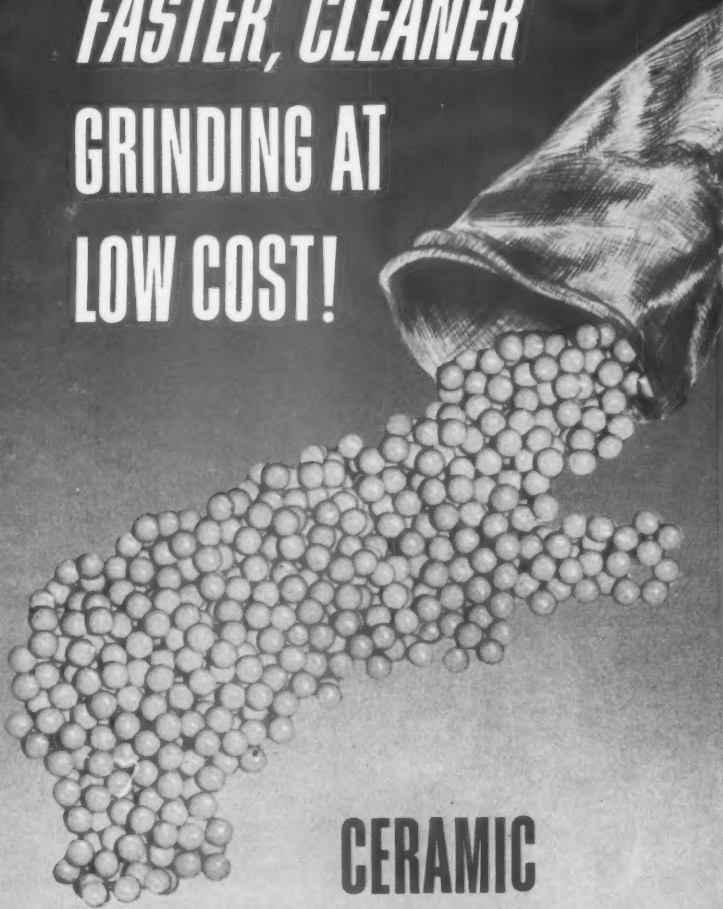


NEW YORK

deflection and assures longer seal life. Long established characteristics of high efficiency, low NPSH, and constantly rising head capacity curves, have been retained in the "package line" which are available in a range of sizes from $\frac{3}{4}$ " x 1 to 3" x 3". Capacities range up to 400 G.P.M. and heads up to 150 feet.

The New York Air Brake Co.,

**FASTER, CLEANER
GRINDING AT
LOW COST!**



CERAMIC GRINDING BALLS

Fast grinding, long wearing porcelain. Carefully fired. Fully vitrified. Impervious. Uniform particle structure. 1/2" to 3" diameters.

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BEAVER FALLS • PENNSYLVANIA

N E W MATERIALS — EQUIPMENT

Aurora Pump Div., Dept. PVP,
Aurora, Ill.

COPOLYMERS Dye Receptive

First three products in a new series of water-emulsion copolymers of vinylpyrrolidone have been announced. They will be available initially in development quantities only and will be marketed under the registered trademark "Polec-tron."

The first three products in this new group will be called Polec-tron 130—which is a vinylpyrrolidone/ethyl acrylate copolymer emulsion; Polec-tron 430—a vinylpyrrolidone/styrene copolymer emulsion; and Polec-tron 450—another vinylpyrrolidone/styrene copolymer emulsion. Each has a 40% solids content.

The features of the series open up new possibilities for water-emulsion polymers in that they offer dye receptivity, unusual emulsion stability, excellent adhesive properties, and unique film-forming properties.

Some of the applications for these new products will be in the adhesives field, where they will bond diverse materials to each other. Additional adhesives uses will be found in textile coating, paper coatings, and glass fiber sizes. The superior dye receptivity exhibited by these products will make them highly desirable as nonwoven fiber binders and latex rug backings. Since these new film formers, in addition to their adhesion properties also show great toughness, evaluation as surface coatings—particularly as metal primers and top coatings for wood—is indicated. They have considerable potential, furthermore, as acid-stable detergent opacifiers and as aerosol starch resins.

Some of the properties inherent in these new emulsion polymers are due to their vinylpyrrolidone content. These products have excellent freeze-thaw stability, shear stability, acid and salt tolerance. They can be crosslinked by exposure to temperatures of 100°C. or higher for one-half to one hour.

All three of the first Polec-tron

NEW MATERIALS — EQUIPMENT

copolymers are insoluble in the following solvents: water, ethyl alcohol, ethyl acetate, acetone, methyl ethyl ketone, benzene, carbon tetrachloride, heptane, and dioxane. Exceptions will be found in Polecron 430 which is partly soluble in benzene and Polecron 450 which is partly soluble in water.

While currently available in development quantities only, the manufacturer intends to make tank car quantities available before the end of 1961 at reduced prices.

General Aniline & Film Corp.,
435 Hudson St., Dept. PVP, New York 14, N. Y.

MANGANESE BON MAROON Easily Dispersed

Standard Ultramarine & Color Co., has announced the introduction of a new and strong manganese BON Maroon, RE-6317 Molara Maroon Toner. Designed particularly for maximum economy in blends with Molybdate Orange, RE-6317 is a companion product to RE-6305 Molara Maroon, which has for years enjoyed wide acceptance by the paint industry.

RE-6317 not only offers maximum toning strength for Molybdate Orange and maximum tinting strength for whites, but also disperses easily by all grinding procedures and provides excellent enamel gloss.

Standard Ultramarine & Color Co., Dept. PVP, 5th Ave. and 25th St., Huntington 18, W. Va.

TINT Flow-Coated

New laboratory formulated product is now being introduced which controls sun fade-glare-heat and is available in eleven different colored tints; each tint possessing its own sun control features, which is odorless as well as non-toxic.

"Sun-Barr" controls the infrared, ultraviolet, as well as the visible light rays; thus can help cut down expensive fading, bothersome glare, and exorbitant air-conditioning costs.

The liquid material is flow-coated on existing glass windows

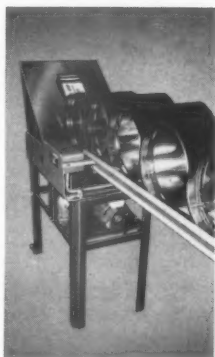
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Also available in Model 12B
(Takes up to 5 gallon pail)

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Top of mixer extends to second floor where it is charged. Note dust control hood.



Note thoroughly dispersed and blended latex paint in mix just before discharge.



Finished mix is discharged on first floor through valve in bottom of mixer.

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and areas, without any interruption to normal inside working operations. The tints after being applied by a specially designed machine, are dry to the touch within four to six hours. Once windows have been coated with Sun-Barr only normal maintenance is required. It has been known to keep its lightfastness for a period of five years, without any appreciable notice of discoloration.

National Glass Tinting Co.,
Dept. PVP, Suite 510, 906 Main St., Cincinnati, Ohio.

BENZIDINE YELLOW PIGMENT Low Oil Absorption

Non-resinated benzidine yellow pigment which combines great strength with extremely low oil absorption, has been recently announced.

The pigment is identified as "Rangoon Yellow Toner 73 T 51." According to the firm, the pigment makes it possible for the paint manufacturer to obtain formulations of high strength coupled with low viscosity, unique and desirable properties which heretofore have been unattainable with other types of benzidine yellows.

Ansbacher-Siegle Corp., Dept. PVP, 92 Chestnut Ave., Rosebank, Staten Island 5, N. Y.

TINTING COLORS Low-Cost Line

New line of economical universal tinting colors has been announced. Called "Cal-Tint," the colors are formulated for merchandising as a universal shelf-goods line for tinting all types of paints: latex, alkyd, acrylic, PVA, oleoresinous.

The new line is different from the firm's Colortrend line of universal colorants. Cal-Tint is a low-cost economy line of high-strength universal tinting colors, whereas the Colortrend colorants are made to the very exacting color control standards required for use in color systems.

The California Ink Co., Inc.,
Dept. PVP, 545 Sansome St., San Francisco 11, Calif.



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THE MANTROSE CORPORATION

Dept. PVP, 99 Park Avenue, New York 16, N. Y.

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PATENTS

Complete copies of any patents or trade-mark registration reported below may be obtained by sending 50c for each copy desired (to foreign countries \$1.00 per copy) to the publisher.

Emulsifier-Wax Compositions

U. S. Patent 2,974,106. George D. Frommuller, Mamaroneck, and Michael J. Mirra, Woodside, N. Y., assignors to Comcolloid, Inc., a Corp. of N. Y.

A substantially anhydrous composition taken from the group consisting of hydrocarbon wax and oil compositions blended with a mixture of emulsifying

agents in sufficient amount to form emulsions, said mixture consisting essentially of a substance taken from the group consisting of glyoxalidines and salts thereof with acids and the condensation product of a glyceride oil with an alkylolamine taken from the group consisting of mono-, di-, and tri-ethanol and propanol-amines, the amounts to glyoxalidine and condensation product being approximately equal.

Polyester Coating

U. S. Patent 2,981,712. Lee Richard Harper, Media, Pa., assignor to E. I. du Pont de Nemours and Co., Wilmington, Del., a Corp. of Dela.

A stable, air-drying liquid organic coating composition prepared by mixing under substantially anhydrous conditions (a) 100 parts by weight of a polyester polymer solution, said solution consisting essentially of 10 parts by weight of xylene and 90 parts by weight

of a polyester polymer having a molecular weight of about 1100, an acid number of about 0.05, a hydroxyl number of about 101 and containing an average of about 2 hydroxyl groups per molecule, (b) 8.4 parts by weight of pentane diol, (c) 21.7 parts by weight of trimethylol propane and (d) 0.2 parts by weight of N,N-dimethyl cyclohexyl amine; heating said mixture to a temperature of about 35°C.; adding to said heated mixture 112.6 parts by weight of a tolylene diisocyanate isomeric composition whereby the temperature of said mixture upon the addition of said tolylene diisocyanate isomeric composition rises to about 135°C., said isomeric composition consisting of 80 percent by weight of 2,4-tolylene diisocyanate and 20 percent by weight of 2,6-tolylene diisocyanate and containing 0.02 percent by weight based on the weight of said diisocyanate of chlorine; cooling the resulting mixture to about 95°C.; adding thereto 104 parts by weight of anhydrous methyl isobutyl ketone followed by heating at 80-90°C. for 3.5 hours.

Urea-Coating

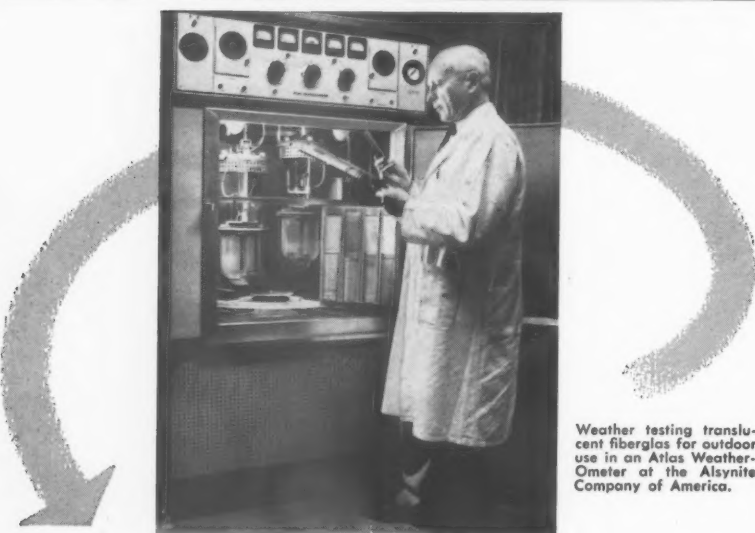
U. S. Patent 2,978,425. Harry M. Culbertson, Wilbraham, and Frank J. Hahn, Springfield, Mass., assignors to Monsanto Chemical Co., St. Louis, Mo., a Corp. of Dela.

A resin comprising an etherified reaction product of at least 2 mols of a monohydric acyclic alcohol containing 1-6 carbon atoms and a co-condensation product of 1 mol of urea, 0-0.3 mol of melamine, 0.02-0.5 mol of an N-substituted melamine and at least 2 mols of formaldehyde; said N-substituted melamine being selected from the group consisting of N,N'-dialkylmelamines, N,N',N''-trialkylmelamines and mixtures thereof, the individual alkyl groups of said N-substituted melamines being acyclic and containing a maximum of about 20 carbon atoms, the total number of carbon atoms contained in all of said alkyl groups not exceeding about 36.

Producing Aqueous Baking Varnishes

U. S. Patent 1,981,703. Herbert Hoemel, Graz, Austria, assignor to Vianova Kunstharz Aktiengesellschaft, Vienna, Austria, a Corp. of Austria.

An improved process for producing a water-soluble resinous composition which comprises the steps of treating an ethylenically unsaturated, plasticized alkyd resin with an oxidizing agent selected from the group consisting of hydrogen peroxide and organic peroxides, said alkyd resin having an acid number of at least about 40 and a hydroxyl equivalent number of about 145-400, the number of hydroxyl groups being substantially greater than car-



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John Lucas & Co., Inc.	General Electric Co.
Rust-Oleum Corp.	E. I. DuPont de Nemours & Co., Inc.
Benjamin Moore & Co.	Glidden Co.
Reardon Co.	Cook Paint & Varnish Co.
	Sherwin-Williams Co.

ATLAS ELECTRIC DEVICES CO.

4114 N. Ravenswood Ave., Chicago 13, Illinois U.S.A.

boxyl groups; combining said treated alkyd resin with a hydrophilic, hardenable, low molecular weight methylol compound selected from the group consisting of (a) a reaction product of formaldehyde and a phenol, said phenol having only one phenolic hydroxyl group per aryl nucleus and at least a portion of the phenol being blocked in one position selected from the group consisting of ortho and para in relation to the phenolic hydroxyl group and (b) a reaction product of formaldehyde and a compound selected from the group consisting of urea and melamine, said reaction product(b) being partially etherified with a low molecular weight monohydric aliphatic alcohol; neutralizing the mixture with a water-soluble base selected from the group consisting of ammonia and strong organic nitrogen bases.

Anti-Rust Compositions

U. S. Patent 2,978,423. Robert Tirtiaux, Notre-Dame de Gravenchon, and Jean Baptiste Signouret, Pau, France, assignors to Esso Standard Societe Anonyme Francaise, Paris, France, a body corporate of France.

A rust inhibiting composition consisting essentially of oil, about 0.1 to 10.0 wt. percent of a polymeric material consisting of an alkoxylated alkyl phenolformaldehyde copolymer and about 0.05 to 5.0 wt. percent of an oil soluble material selected from the group consisting of alkali metal sulfonates of 12 to 25 carbon atoms and alkali metal naphthenates of 8 to 18 carbon atoms, and wherein said alkoxylated alkyl phenols contains about one to four C_2 to C_6 alkylene oxy groups per molecule and about one to two C_6 to C_{20} alkyl groups per molecule.

Chemically Resistant Coatings

U. S. Patent 2,979,418. Charles D. Dipner, Cranford, N. J., assignor to Minnesota Mining and Mfg. Co., St. Paul, Minn., a Corp. of Dela.

A process which comprises applying successively to a substrate a first, metal oxide free, coating composition comprising a polymer of a fluorine-containing olefin having between 2 and 5 carbon atoms and having at least one atom of a normally gaseous halogen for every two carbon atoms of said olefin, and at least one adhesive resin selected from the group consisting of epoxide resin and phenolic resin, the adhesive resin-to-polymer ratio ranging from about 10:90 to about 90:10, and a second coating composition being free of said adhesive resin and comprising a metal oxide of a metal above the fourth group of the periodic table, said metal having a melting point between 600°C. and 1500°C., and a polymer of a fluorine-containing olefin, the metal oxide-to-polymer ratio ranging from

about 5:100 to about 60:100, and finally heating said coatings to a temperature between about 420°F. and about 600°F. to provide a fused adherent coating on the surface of the substrate.

Coating Compositions Containing Aminoplast Resins

U. S. Patent 2,980,637. Harry M. Culbertson, Wilbraham, Mass., and Byron L. Williams, Jr., Texas City, Tex., assignors to Monsanto Chemical Co., St. Louis, Mo., a Corp. of Dela.

A protective coating composition comprising an organic solvent solution of a ternary mixture of (1) an oil-modified alkyd resin, (2) an etherified formaldehyde condensate of an N-substituted melamine and (3) an etherified formaldehyde condensate of melamine; said oil-modified alkyd resin constituting 50-90 weight percent of the

total of (1), (2) and (3); said etherified formaldehyde condensate of an N-substituted melamine constituting at least 5 weight percent of the total of (2) (3); said etherified formaldehyde condensate of an N-substituted melamine being a resin that is prepared by heating mixture of at least 3 mols of a monohydric acyclic alcohol containing 1-6 carbon atoms and a condensation product of 1 mol of an N-substituted melamine and at least 1 mol of formaldehyde to substantially atmospheric reflux temperature at a pH of 5.5-7.0 for a period of time sufficient to etherify and polymerize said condensation product of the N-substituted melamine and formaldehyde; said N-substituted melamine being selected from the group consisting of N,N'-dialkylmelamines, N,N',N''-trialkylmelamines and mixtures thereof, the individual alkyl groups

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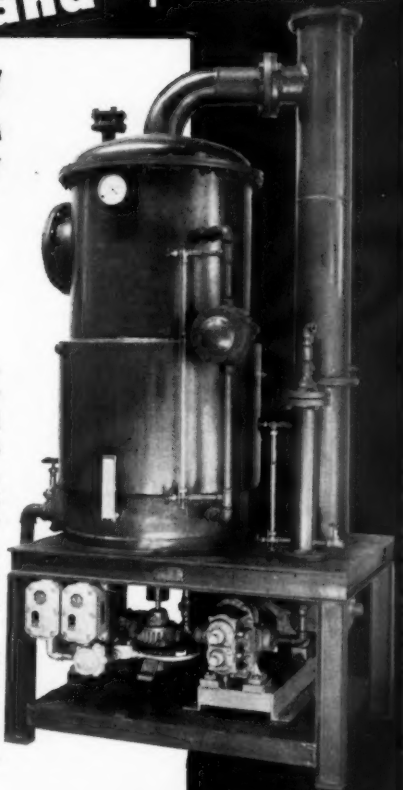
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of said N-substituted melamines being acyclic and containing a maximum of about 20 carbon atoms and the total number of carbon atoms contained in all of said alkyl groups not exceeding about 36; said etherified formaldehyde condensate of melamine being an etherified reaction product of at least 4 mols of a monohydric acyclic alcohol containing 1-6 carbon atoms and a condensation product of 1 mol of melamine and at least 3 mols of formaldehyde.

Color Stable Lacquer

U. S. Patent 2,980,642. Collins E. Bushnell, Lancaster, and John A. Parker, West Lampeter Township, Lancaster County, Pa., assignors to Armstrong Cork Company, Lancaster, Pa., a Corp. of Pa.

A color-stable lacquer comprising relative proportions of 100 parts by weight polymerized vinyl chloride resin selected from the group consisting of

polyvinyl chloride and vinyl chloride-vinyl acetate copolymers containing 2-15% by weight vinyl acetate, about 100-300 parts by weight of a solvent system for said resin, about 20-60 parts by weight 1,3-butylene adipate having a hydroxyl number in the range of about 30-50 and an acid number in the range of about 2-7, and about 1-3 parts by weight of a compound selected from the group consisting of formaldehyde, paraformaldehyde, and polyoxymethylene diacetate.

Alkyd-Amino Coating

U. S. Patent 2,980,636. Harry M. Culbertson, Wilbraham, Mass., and Byron L. Williams, Jr., North Texas City, Tex., assignors to Monsanto Chemical Co., St. Louis, Mo., a Corp. of Dela.

A protective coating composition comprising an organic solvent solution of a ternary mixture of (1) an oil-modified alkyd resin, (2) an etherified

formaldehyde condensate of melamine and (3) a compound of the group consisting of (a) an N-substituted melamine of the group consisting of N,N'-dicyclohexylmelamine, N,N',N''-tricyclohexylmelamine and mixtures thereof and (b) an unetherified formaldehyde condensate of an N-substituted melamine of the group consisting of N,N'-dicyclohexylmelamine, N,N',N''-tricyclohexylmelamine and mixtures thereof; said oil-modified alkyd resin constituting 50-90 weight percent of the total of (1), (2) and (3); said component (3) constituting 5-80 weight percent of the total of (2) and (3); said etherified formaldehyde condensate of melamine being an etherified reaction product of at least 4 mols of a monohydric alcohol containing 1-6 carbon atoms and a condensation product of 1 mol of melamine and at least 3 mols of formaldehyde.

Water Soluble Resins

U. S. Patent 2,981,710. Herbert Hoelzel, Graz, Austria, Assignor to Vianova Kunstharz Aktiengesellschaft, Vienna, Austria, a Corp. of Austria.

A substantially neutral composition of matter being water dilutable, which comprises the following components: (I) a low molecular weight resol of formaldehyde and a phenol in which the total number of positions on the benzene ring which are reactable with formaldehyde, selected from a group consisting of ortho- and para- in relation to the phenolic hydroxy groups is essentially two, said resol having at least one carboxylic group chemically bonded to the resol and an acid number ranging between 100 and 250; (II) a plasticizing alkyd resin which has an acid number of at least 35 and which due to its being obtained from an excess of hydroxy compounds has a free hydroxyl value of from 200-400 and; (III) a water soluble base selected from the group consisting of ammonia and strongly basic amines.

Metal Primers

U. S. Patent 2,978,424. Kenneth F. Atwood, Atlanta, Ga., and Austin K. Long, Bay Village, and Owen F. Shobe, Lakewood, Ohio., assignors to The Glidden Co., Cleveland, Ohio, a Corp. of Ohio.

A coating composition adapted for use as a protective coating in direct contact with corroded metal such as rusty ferrous metal, said composition consisting essentially of: an organic-solvent solution of film-forming weather-resistant material of the air-drying type, dispersed pigment including anticorrosive pigment in an amount sufficient to bring the pigment volume into the range of about 25% to 60% of the total volume of said coating composition, said wetting additive being at least one ester of (A) monohydric alcohol.

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BOB CURTIN Cleveland, ED 3-0188	BILL SNYDER Louisville, JU 3-7634
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TITANOX-RA may well be the pigment that gives you greater value for your pigmentation dollar. To determine the adaptability of TITANOX-RA or other types of TITANOX to your products, we invite you to get in touch with our Technical Service Department for more complete details. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; offices and warehouses in principal cities. In Canada: Canadian Titanium Pigments, Ltd., Montreal.

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TECHNICAL Bulletins

MASKS

New brochure which describes and illustrates all of the various types of masks employed in the multiple color wet painting of mass produced products has just been issued.

Examples of line production spraying with these electroformed metal masks are pictorialized. Requirements for mask ordering are also detailed.

Conforming Matrix Corp., Dept. PVP, 811 New York Ave., Toledo 11, Ohio.

MODIFIED CLAYS

Technical bulletin on research work conducted to improve the surface properties of extender pigments, has been offered. Summarizing its years of study on specially processed water-washed kaolins, the firm has outlined the steps followed, the tests made and the procedures used, and the results obtained in preparing ASPs that were generally repellant to water and preferentially wet by organic systems.

The development of surface modified clays took several years of laboratory research, and included extensive field trails. Conducted to overcome the troublesome presence of surface adsorbed water, which interferes with the efficiency of pigments in an organic system,

the findings are of particular interest to manufacturers of paints, reinforced plastics and printing inks.

Minerals & Chemicals Philipp Corp., Dept. PVP, Menlo Park, N. J.

FORK LIFT TRUCKS

New 94-page manual on servicing electric fork trucks is available.

Titled "Servicing the Clarklift Electric," the manual is the most comprehensive ever published by the firm on electric truck maintenance. It includes 189 photographs and 41 color-coded schematic circuits and is available from the company for \$2.00.

The manual is divided into two parts and an appendix. Part one contains information on basic electricity, testing instruments, basic checking steps, and inspection repair.

Part two provides complete information on the operation and testing and repair of the carbon pile.

The appendix includes complete specifications, fold-out wiring diagrams, and detailed adjustment procedures for all Clarklift electric trucks.

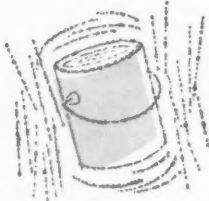
Manuals and Statistics Department, Industrial Truck Div., **Clark Equipment Co.**, Dept. PVP, Battle Creek, Mich.

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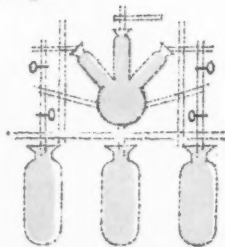
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PROTECTIVE LININGS

New 49 page test chart manual is designed to help steel container users, manufacturers and reconditioners select proper protective linings by telling "which lining holds what for how long."

The manual is based on an extensive lining test program, which is considered unique because of the extremely wide range of products tested, the frequency of product examination and the variety of test procedures used.

Thirty-nine pages of test results, listing the holding qualities of Sterilkote linings for hundreds of different products, are included in the new booklet. It is found to be a valuable reference and guide not only because it quickly directs users to the appropriate lining, but because it also tells which linings not to use.

In addition, the brochure de-

scribes each lining in detail, outlines the test program and explains the company's evaluation system.

Bradley & Vrooman Co., Linings Evaluation Dept., Dept. PVP, 2629 South Dearborn St., Chicago 16, Ill.

SILICONES

New eight-page, two-color catalog describing the complete line of silicones and their uses is now available.

Designated CDS-129C, the catalog is liberally illustrated with photos and contains data pertaining to the various silicone products, including a complete selector guide for silicone rubber.

The catalog is broken down into four general categories dealing with silicone fluids, silicone protective coatings, silicone electrical insulation and silicone rubber. A new feature of the catalog is the grouping of product types wherever possible under appropriate end-use headings (i.e. paint vehicles, electrical impregnating and coating varnishes, etc.).

New products described in CDS-129C include RTV-11, the newest

and lowest viscosity room temperature vulcanizing liquid silicone rubber; LTV-602, a new clear, flexible silicone potting and embedding compound; and Dri-Film (R) 144, a new solvent based silicone water repellent for use in masonry water repellent formulations.

General Electric Co., Silicone Products Dept., Dept. PVP, Watford, N. Y.

BUSINESS PUBLICATIONS

How can the American business man cope with the reading load posed by the ever-growing though important business and trade publications? In his resolve to solve this problem, how can he develop efficient reading habits so that he can extract the maximum personal profit from this ubiquitous business press?

Fred Wittner, President of a New York advertising and public relations firm specializing in communications to industry, has produced a succinct "how-to" booklet that will help business people to profitable reading of business publications. The booklet, entitled

"Why, When and How to Read Business Publications," is available without charge.

Fred Wittner Co., Inc., Dept. PVP, 581 Fifth Ave., New York 17, N. Y.

INDUSTRIAL ALCOHOL

New guide to bulk storage of specially denatured alcohol and proprietary solvents has just been published.

The guide covers government regulations relating to storage of specially denatured alcohol and proprietary solvents. It also has sections devoted to suggested tank design, size, and location; auxiliary equipment including pumps, pipe and fittings, valves, electrical grounding procedures, vents, and measuring devices. The bulletin contains drawings of typical above and below ground storage tanks. A typical gauging well and methods of anchoring underground tanks are also illustrated in detail.

Technical Literature Dept., **U. S. Industrial Chemicals Co.,** Dept. PVP, 99 Park Ave., New York 16, N. Y.

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XX-620 (Densified)	Medium	Acicular	105
XX-50	Medium	Nodular	115
XX-501 (Densified)	Medium	Nodular	115
XX-2	Fine	Nodular	130
XX-55	Fine	Nodular	140
XX-601	Medium	Acicular	160
XX-621 (Densified)	Medium	Acicular	160
XX-602	Fine	Acicular	220

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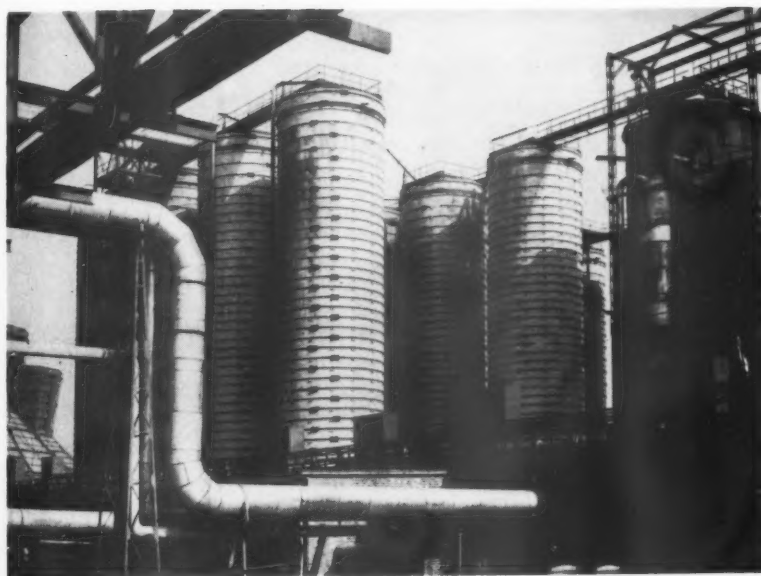
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POLISH PAINT INDUSTRY ON LONG ROAD TO RECOVERY

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By
Walter B. Maass



Production of synthetic rubber, will increase to 36,000 tons annually by 1965.



Nitrogen works at Kedzierzyn—one of the biggest chemical plants in Poland.

PAINT AND VARNISH PRODUCTION, June 1961

PERHAPS no other European country has had a more turbulent and tragic history than Poland.

Recreated in 1918 after 150 years of partition and oppression, the Polish Republic travelled through two troubled decades towards her complete annihilation in 1939. The next five years were the worst in the history of the Polish people. Systematic plunder and destruction by the Nazis drove the Poles to the desperate Warsaw rising up in 1944.

It collapsed under the eyes of the Red Army which had already reached the Vistula river. The Polish capital, already severely damaged during the siege of 1939 and the Ghetto revolt of 1943, fought to the last. When it was finally occupied by the Russians on January 17, 1945 it was a city of ruins; 85% of the buildings were destroyed. About 800,000 of the inhabitants had perished during the war. The destruction was of such magnitude that at one time it was seriously considered not to rebuild the city at all.

Nevertheless, Warsaw has risen again, though it still shows abundant marks of its mortal struggle. Characteristically, the Poles have rebuilt the old historical parts exactly according to its ancient style, an immensely difficult task which could have only been undertaken by a people with a romantic and passionate love of its past.

Naturally, many districts which contained no historical monuments, had to be modernized. The two large bridges across the Vistula were rebuilt and traffic improved by two new thoroughfares. In the centre, Russian architects erected an enormous skyscraper, the palace of culture and science, as a gift of the Soviets to Poland. It looks strangely out of place in a city which prefers the classical style.

But Warsaw's reconstruction was only one of Poland's many postwar problems. Many other cities had suffered grave damage. Fortunately, Cracow, the third largest and most beautiful city, had remained undamaged. The newly acquired provinces in the West were largely in ruins and on top of it a mass

migration took place from the Eastern territories, ceded to the Soviet Union.

Under such circumstances, it is hardly surprising that a great part of Poland's industry was destroyed or sadly lacking raw materials and equipment. Production of paints and allied coatings had amounted to 4,200 metric tons in 1937. In 1946 it was down to 1800 tons and the crying need for paint after so much destruction can be easily imagined. The first task was to get the chemical industry going again. Poland is by no means a country without natural resources. It is one of the major producers of coal in Europe. Sulphur, rock salt, limestone, phosphates, barytes,

bauxite, magnesite and zinc ores are mined and processed. There is also some natural gas. The oil rich region of Borislaw-Drogobycz, already annexed by the Russians in 1939, was again ceded to the Soviet Union after World War II.

Polish Paint Industry

The development of the paint industry can be best understood as a part of the chemical industry. Figures are now available. As we have seen the Poles started in 1946 with next to nothing but in 1949 paint production had reached 10,700 metric tons and ten years later it had grown to 68,000 tons. For 1960 a volume of ten percent above that last figure has been projected.

Considering the desperate condition of the country at war's end and the complete change of the economical system, this is certainly very healthy growth. It shows once again that the paint industry as such is indestructible and will expand under any social or economical system.

The Poles claim that they will reach 130,000 tons by 1965. This is perhaps too optimistic. Further growth is almost a necessity. The present output is still low for a country with 29 million inhabitants when compared with Western Europe. Poland's present use of paint per capita is about 5.5 lbs. of paint, an average of two quarts. Most West European countries use about three times as much, some even more.

Raw Materials

It is interesting to compare the paint figures with those available for synthetic resins. In 1955 only 9,230 tons of resins were produced. Four years later it had quadrupled and for 1960 a rise to 55,700 tons is being anticipated. Clearly, this is a fast growing sector of the economy, developing with greater speed than the paint industry. On the other hand, production of lithopone—in Poland a very popular pigment—advanced from 6,050 tons in 1955 to only 9,300 tons in 1960 (projected figure).—Zinc Oxide is made in very good quality and widely exported, often on a reciprocity basis. Such transactions are encouraged because of Poland's lack of foreign currency. Red lead, chrome yellow, milori blue and other inorganic pigments are also manufactured in good grade quality. Like in all countries of the Eastern Bloc, a vigorous effort for producing more raw materials is in progress. The nitrocellulose factory in Pionki which existed already prior to World War II has been rebuilt to handle nitrates, wood cellulose, as well as linters. Sooner or later it will give the French and the Germans stiff competition. A very large nitrogen plant has been built in Kedzierzyn which will make increased production of amino resins possible. Phenolic resins—mainly for laminates—are made in Cracow and Gliwice.

During the war, IG Farben had

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built a synthetic rubber plant at Oswiecim (Auschwitz) where slave labor from a nearby concentration camp was easily available. This factory is still in existence and now produces butadiene-styrene copolymers. Most of it seems to be used in the rubber and plastic industry. Latex paints appear to be still in an early stage of development. This is a field where the West is still far ahead.

Coaltar and its derivatives—among other, coumarone resins—form an important part of Poland's chemical industry. Phenol, naphthalene and toluol are being exported in considerable quantities.

Foreign Imports

Work to improve the country's position in industrial finishes is also in progress. A certain number of specialties are still being imported. The author visited a container factory in Cracow and noticed that most coatings in use were of West German origin. Insulating varnishes are also frequently purchased abroad. Among domestic products lacquers — especially for the leather industry — play an important part. Leather is Poland's traditional business and it is quite natural that increased attention is given to leather coatings. As in the US, leather finishes are mainly based on nitrocellulose. Recently, a polymethacrylate emulsion coating has been developed. It is being force dried 1 - 2 hours at 105 - 140° F. and serves as a ground coat. After a six hour interval, the first coat of tinted cellulose lacquer is applied by spray, followed by two more coats, each with a twenty four hour interval. Some Polish factories are also force drying the lacquers, which cuts those long intervals to 2 - 3 hours. The process is completed with one coat of clear leather lacquer. Finally, the finished leather is buffed to high gloss under heat and hydraulic pressure.

Like in all countries of the Soviet Bloc, trade sale paints are given far less attention than industrial finishes. Polish appliances as shown in department stores are not yet up to American standard. They lack eye appeal but the durability of the finish seems to be adequate. The increasingly popular Polish motor scooter is also fairly well

finished. But in trade sales the country is far behind Central Europe, not to mention the United States. One look at the half rusted, poorly labeled paint cans which are displayed in the stores tells at least part of the story. Interior enamels and wall paints, even in new buildings, are of mediocre quality.

The Poles are quite aware of this fact and don't deny it. They point out that the need for reconstruction made industrial finishes the object of their main effort. There is a certain amount of truth in this statement. Nothing would be more foolish than downgrading those energetic people because of outward appearances. Poland's retail trade is not fully nationalized. A certain number of independent stores do exist but merchandizing

and display could hardly flourish under postwar conditions. With all their adversities, the nation has certainly shown great vitality. They have a definite style of their own, perhaps more so than the other East European countries. Poland maintains its cherished traditional ways and customs and many of its spiritual roots are in the West. Old world charm and chivalry have still their meaning, notwithstanding the great social upheaval of the last fifteen years. Western plays and movies are very popular.

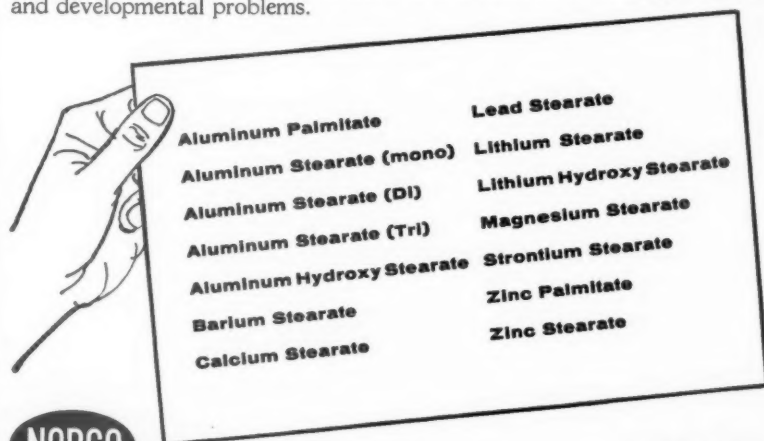
While the author visited Cracow, a large equestrian statue of Tadeusz Kosciuszko was once more erected on Wawel Hill. The Nazis had destroyed the monument of the national hero. The fact that it has now risen again, is perhaps not without significance.

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LAKOKRASOCHNYE MATERIALY I IKH PRIMENENIE

Application of Polyacrylates as Film-Forming Substances. Communication I: Polyesteracrylates as Film-Forming Substances in Wood-Finishing Lacquers.

K. P. Belaeva, Ya. L. Raskin, and A. A. Berlin. *Lakokrasochnye Materialy i Ikh Primenenie*, 1960, No. 6, 5-11.

As a result of the investigation of film-forming properties of various polyester-

acrylates, the authors have established the possibility of preparing fundamentally new types of coating-hardening, wood-finishing lacquers. The rate of hardening, and the physico-mechanical properties of these lacquers are variables of the structure of polyesteracrylates; it is therefore possible to modify these properties by suitably combining the polyesteracrylates used. The latter are

also capable of gellatinizing collodion; introduction of the lacquer into solutions of highly viscous collodion in volatile solvents then prevents running of lacquer applied to vertical surfaces. Polyesteracrylate lacquers have a relatively long life, and can be applied by spraying with single-jet atomizers. The influences of residues of reduction-oxidation systems, addition of alkyd resin and aromatic solvents on the hardening and life-length of polyesteracrylate lacquers are shown; 2% benzoyl peroxide and 0.5% cobalt linoleate are recommended as redox system. The conditions for optimum rate of hardening of films at room temperature are given. The two types of polyesteracrylate lacquers prepared (PE-211 and PE-214) are stable to water and alcohol, and less inflammable than nitro-lacquers. Their use permits to reduce the number of coats to one, while improving the quality of wood finishing.

Photocolorimetric Determination of Free Diphenylolpropane in Epoxy Resins.

P. M. Bogatyrev, E. A. Navyazhskaya, and V. S. Sporykhina. *Lakokrasochnye Materialy i Ikh Primenenie*, 1960, No. 6, 53-55.

The described express photocolorimetric determination of free 2,2-di-(*p*-oxyphenyl)propane in epoxy resins relies on a color reaction of extracted diphenylolpropane with diazoparanitroaniline. The simple method is suitable for quality control in production of epoxy resin.

Increase of Chalking Stability of Muffle Zinc Whites in Atmospheric Conditions.

N. K. Pictorinskaya, D. M. Shub, M. L. Borodina, and P. M. Bogatyrev. *Lakokrasochnye Materialy i Ikh Primenenie*, 1960, No. 6, 21-26.

The highest chalking in atmospheric conditions is exhibited by fine-needle zinc whites, prepared from pure zinc by the muffle process, without introducing generator gas into the muffle. The introduction of generator gas (purified) into the muffle lends the resulting zinc oxide an improved stability to chalking. A similar effect is obtained by adding to metallic zinc small amounts of copper, cadmium or lead. Since the atmospheric stability of zinc oxides can be quickly determined photoelectrochemically, it is possible to dispense with the artificial-weather apparatus. The introduction of generator gas into the muffle slightly increases the contents of water-soluble sulfur salts in the prepared zinc oxide; their neutralization by barium carbonate is indicated to eliminate the possibility sulphate action on the paint and lacquer coating.

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SOLVENTS

(From page 38)

tract from the final performance of the coating. For these reasons solvents having little or no reactivity are desired.

One method used by the coatings industry for determining whether a solvent is suitable for use with isocyanates is to determine the isocyanate equivalent of the solvent. The higher the isocyanate equivalent the more suitable the solvent is for reactive urethane coatings.

Distilled toluene is practically inert to reaction with isocyanate, as shown by its high isocyanate equivalent number in Table I.

A general rule would be that solvents with isocyanate equivalents lower than 2,000 should not be used in reactive urethanes.

In general the solvent systems for the reactive urethanes consist of equal parts of esters (urethane grade) and aromatic hydrocarbons such as toluene or xylene. Some selected ketones may also be used. Small amounts of aliphatic hydrocarbons might also be used but caution must be exercised since some reactive urethanes have very limited tolerance for these materials.

Epoxy Resin Systems

Epoxy resins are used in three principal ways in surface coatings: (1) by esterifying the epoxy resins with various vegetable acids and subsequently curing by oxidation or heat polymerization, (2) in combination with the urea- or phenol-formaldehyde resins as heat-converted films, and (3) as films converted either at room or elevated temperatures with amines or amides, such as the polyamide resins.

The largest volume marketed, of the above, are the epoxy resin-fatty ester systems. These coatings are a compromise between cost and performance since modification with fatty acids reduces the cost and allows the use of lower

cost solvents, such as aromatic and aliphatic hydrocarbons. This compromise is, however, at the expense of the chemical resistance properties of the coating.

Epoxy resins, heat converted in combination with the urea- or phenol-formaldehyde resins, give coatings of maximum chemical resistance, hardness, and solvent resistance. The same solvents may be used for both the urea- and the phenol-formaldehyde systems and are based on aromatic hydrocarbons, ketones, and alcohols.

In amine-cured epoxy systems, the coating is converted by the chemical reaction of the amine or by the catalytic action of the

amine, or a combination of both actions. The reactive amine is packaged separately and is added to the epoxy resin vehicle prior to use. Solvents useful in preparing amine catalyst solutions are butanol, "Cellosolve"* solvent, toluene, and xylene. Solvents useful for the epoxy resin solutions are ketones, glycol ethers, "Cellosolve"* acetate, toluene, and xylene.

Table II illustrates typical solvent systems for the phenol-formaldehyde and amine-cured epoxy coating systems. The amine catalysts, for the amine-cured systems, used most widely for room temperature or low-bake systems are diethylene triamine, ethylene dia-

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☐ Sample of
ASP 400

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*Cellosolve, registered trademark of Union Carbide Corporation.



MINERALS & CHEMICALS PHILIPP

mine, and triethylene tetramine. Diethylaminopropylamine may be used for higher bake systems.

Nitrocellulose Resin Systems

Of the cellulosic coatings, nitrocellulose accounts for the bulk of the market. The technology of such formulations is well established and there are too many possible variations to survey them in detail in this article.

A typical nitrocellulose solvent system, or thinner for nitrocellulose lacquers, consists of active solvent, latent solvent or coupler, and diluent. The active solvent (ester, ketone, glycol-ether) dis-

solves the nitrocellulose. The latent solvent, usually alcohol, will not dissolve nitrocellulose but can be used in appreciable quantities without reducing the solvent power of the active solvent. The diluent, aliphatic or aromatic hydrocarbons, is often a good solvent for the modifying resins and is also used to reduce the amounts of the more expensive active and latent solvents.

Selection of thinner components is, of course, influenced by the over-all evaporation characteristics desired for the lacquer. Ketones, in many cases, provide formula-

tion with maximum solids at a given spray viscosity or a lower viscosity at the same solids content. Esters impart excellent flow and resin compatibility properties. Addition of slower evaporating active solvents, such as "Cellosolve"* assists in control of moisture-blush and flow-out characteristics of the lacquer.

Vinyl Resins Systems

Stronger solvents, such as the ketones, are needed in vinyl lacquers because of the solubility characteristics of the vinyls. Alco-

TABLE II.—Typical Epoxy Coatings Solvent Systems

Phenol-Formaldehyde-Epoxy System	Per Cent by Weight
Methyl Isobutyl Ketone.....	25
Methyl Amyl Alcohol or Butyl Alcohol.....	25
Toluene.....	25
Xylene.....	25
Amine-Cured Epoxy System	Per Cent by Weight
Methyl Isobutyl Ketone.....	45
Butyl "Cellosolve"*.....	5
Toluene.....	50

hols are avoided because of poor tolerance for them by the vinyls. The same is true for aliphatic hydrocarbons.

Preferred solvent systems for solution-grade vinyl resins are blends of ketones and aromatic hydrocarbons. The selection and proportioning of specific thinner components will depend upon the method of application intended for the vinyl coating. A faster evaporating solvent system will be used for spray coating, a slower evaporating solvent system for roller applications.

Acrylic Resin Systems

Acrylic coatings or nitrocellulose-modified acrylic coatings are comparatively recent developments. The choice of solvent systems will, of course, depend to a large extent on the particular resin being used. Many of the common lacquer solvents are generally used in formulating solvent systems for acrylic coatings. Low-boiling ketones and aromatic hydrocarbons, with the addition of "Cellosolve"* acetate for good flowout, comprise a typical thinner for an automotive acrylic coating.

*Cellosolve, registered trademark of Union Carbide Corporation.



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Solids	55 ± 1%
pH	4 — 5
Average Particle size ..	.2 Micron
Freeze—thaw resistance ..	Excellent
Mechanical Resistance ..	Excellent
Borax Stability	Excellent
Water Resistance	Better than average PVA
Weight per gallon	8.9 — 9.1 lbs.

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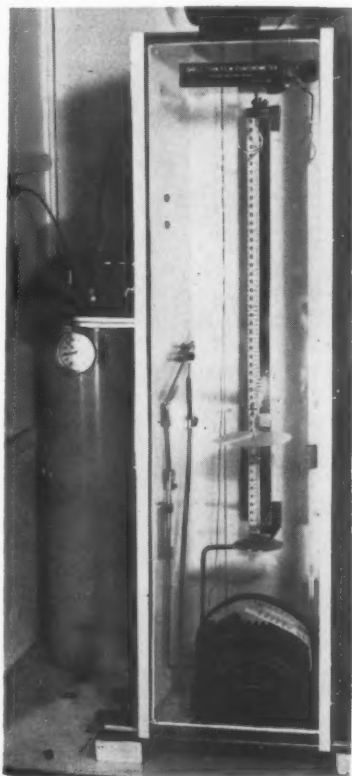
HIGH BOILERS

(From page 31)

improvement in water tolerance. Combinations of Pent-Oxol with isopropyl alcohol as the solvent system for wash primers give approximately twice the water tolerance as a solvent system based on normal butyl alcohol and isopropyl alcohol or ethyl alcohol. This feature is, of course, important in wash primers since they may be applied over wet metal or in highly humid atmosphere. The same feature can also be important in wood sealers based on polyvinyl butyral resins such as ²Butvar B-90 or ³Vinylite XYHL.

2. Shawinigan Resins Corp.

3. Union Carbide Plastics Co.



Volatility of solvents and solvent blends is determined on the Shell thin film evaporometer to produce curves like those shown in Figure 1.



Film hardness of applied coatings is obtained by use of a microhardness tester.

Physiological Properties

Acute toxicity studies indicate that Pent-Oxone and Pent-Oxol are not highly toxic chemicals. Their action on the body would appear to be limited to that of an anesthetic such as ether or acetone. The usual precautions, proper ventilation and avoidance of repeated or prolonged skin contact, should be taken in the use of these solvents.

The information in this report is based on data obtained by our own research and is considered accurate. However, no warranty is expressed or implied regarding the accuracy of these data, the results to be obtained from the use thereof, or that any such use will not infringe any patent. This information is furnished upon the condition that the person receiving it shall make his own tests to determine the suitability thereof for his particular purpose.

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For complete information on CELLOSOLVE Acetate and the other standard Acrylic solvents—such as Acetone, Methyl Ethyl Ketone, Methyl Isobutyl Ketone, and Isopropanol—call your nearest CARBIDE Technical Representative, or write: Union Carbide Chemicals Company, Division of Union Carbide Corporation, 270 Park Avenue, New York 17, New York.

**UNION CARBIDE
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AEROSOL COATINGS

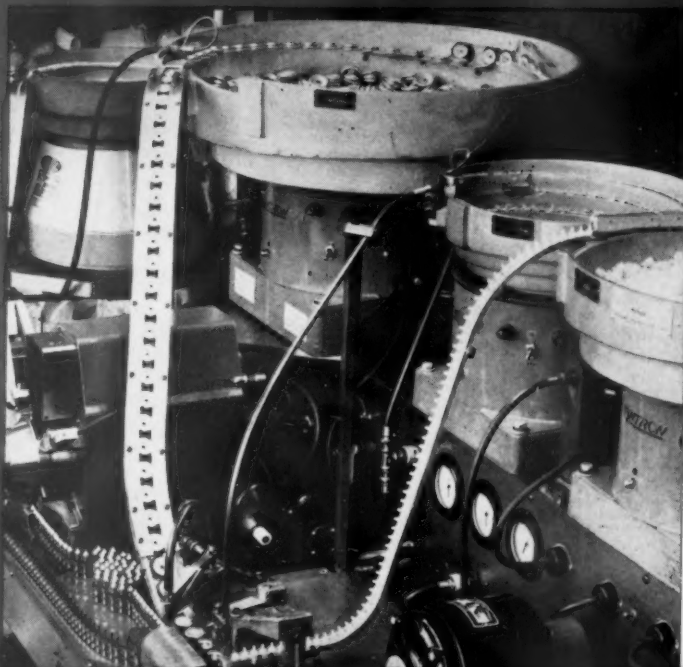


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PRODUCTION

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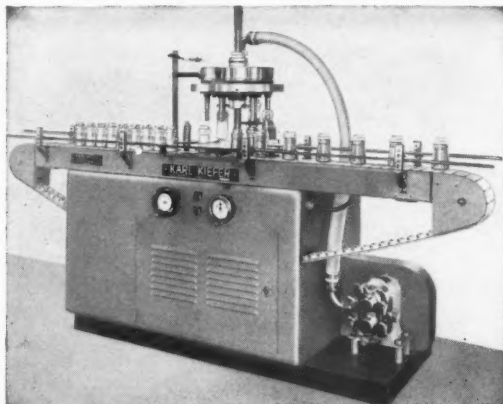
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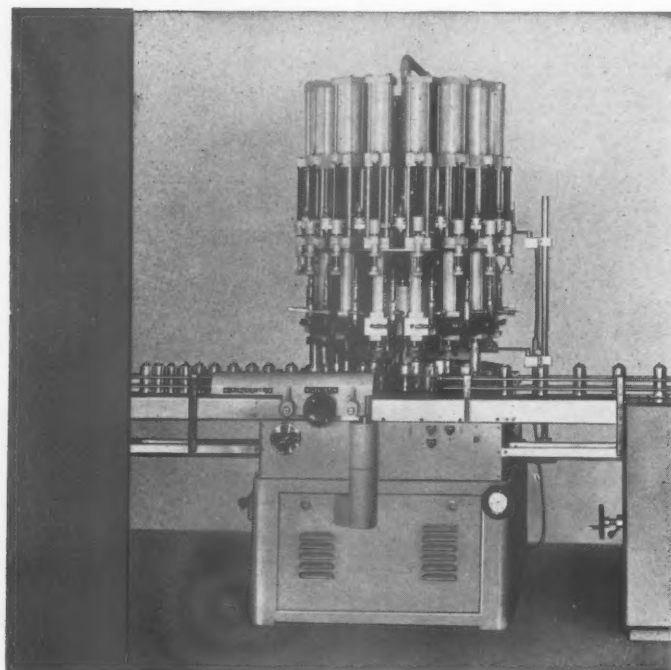
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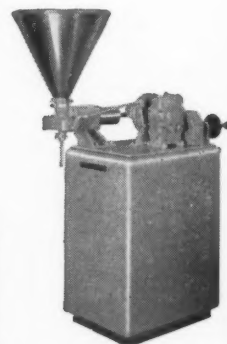
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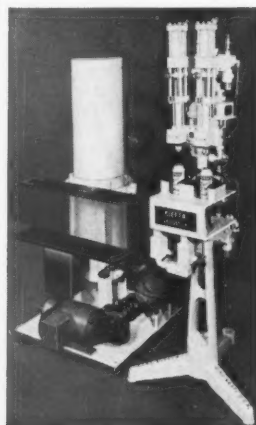
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2-STEM GAS-JET Jr.
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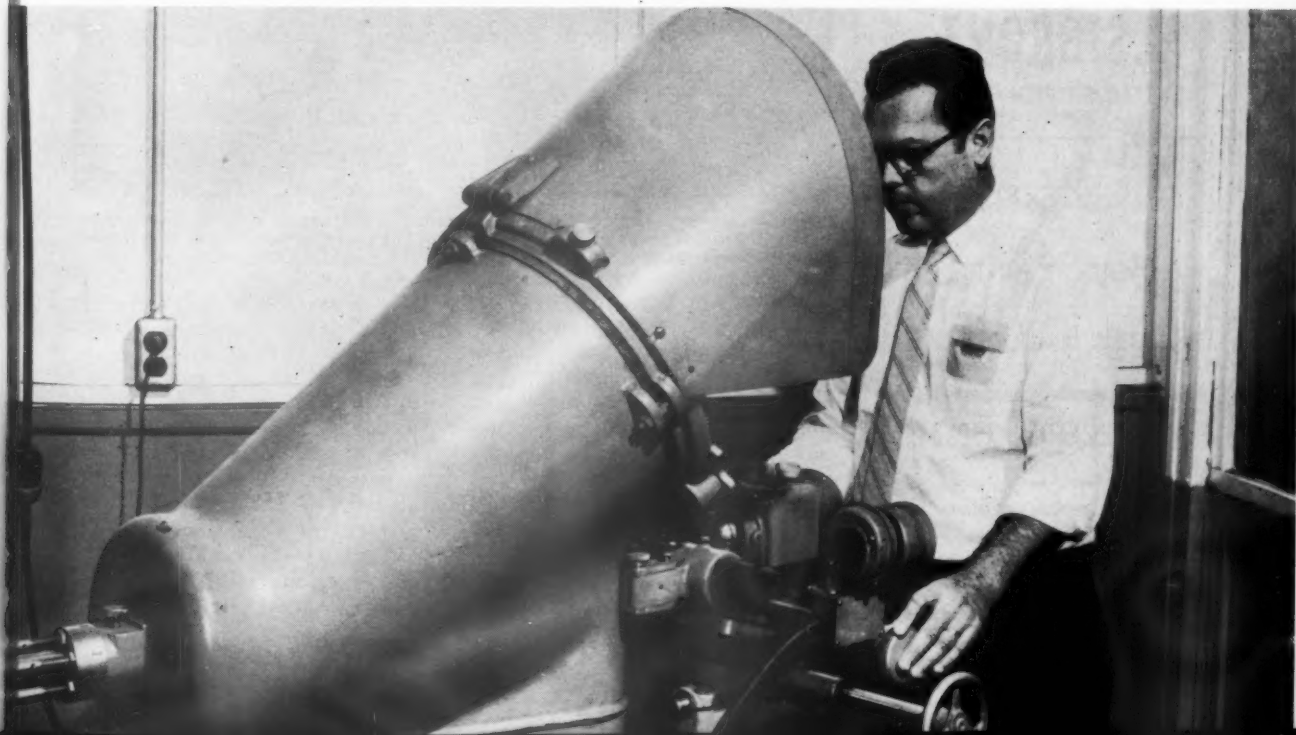
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Working closely with packagers and product manufacturers, it already has developed a number of specially-tailored versions of its basic valve to accommodate a rapidly-broadening range of dispensing requirements. The tailored valve designs combine the many advantages of the basic unit—including feather-touch actuation, aim-true spray control, and competitive price—and are the first offspring of a growing family of valve types which eventually will offer comprehensive coverage of all future dispensing device needs.

The success of the company's basic toggle-action aerosol valve justifies its concentration of its design-engineering effort in this direction. The design avoids all of the sealing problems encountered in the industry's early units—strong closure springs for good sealing which require relatively heavy finger pressure to actuate; comprises using lighter spring tension for softer actuation but which gave less positive sealing. In the Schrader toggle- (or tilt) action valve, spring tension is specified at a high value to insure perfection sealing

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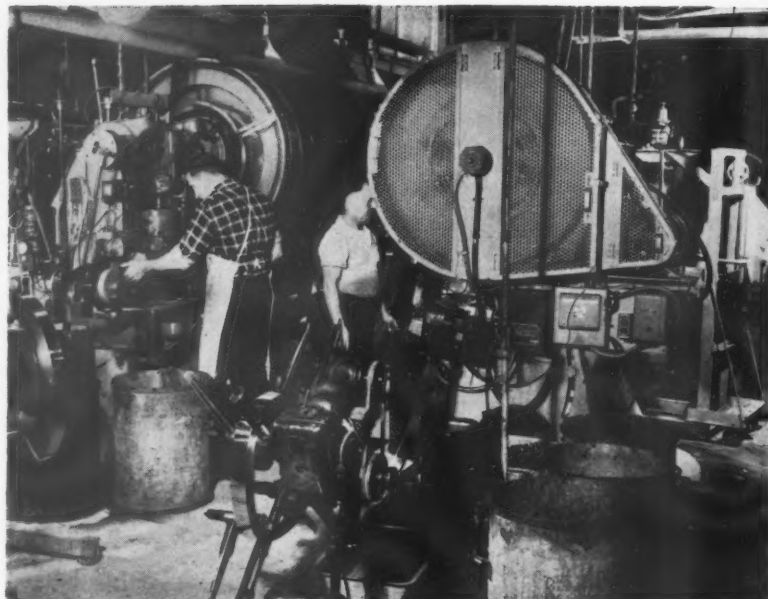
HOUSE PAINTS

LATEX-EMULSIONS

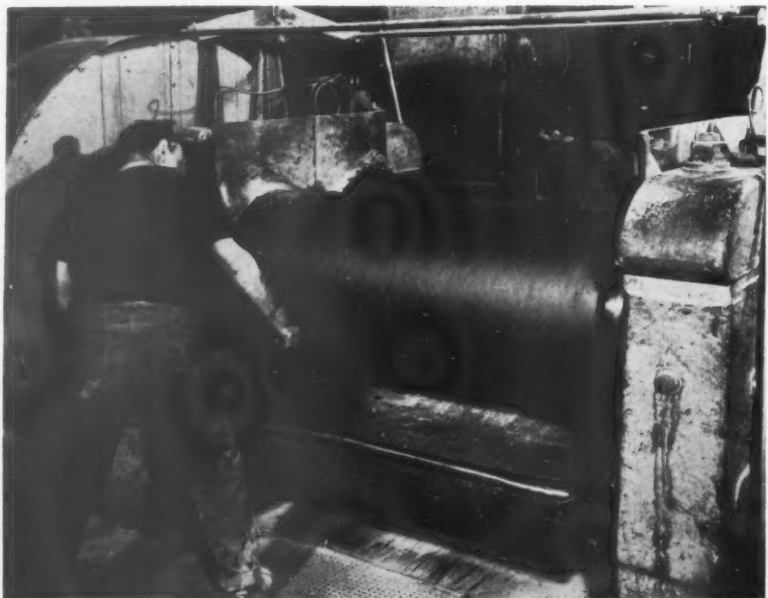
FRANKLIN MINERAL PRODUCTS

COMPANY
FRANKLIN, NORTH CAROLINA
INCORPORATED 1926

Agents in Principal Cities



Company makes its own cups to insure high quality and absolute control of production scheduling.



Synthetic elastomers and other components are blended in a mixer, then transferred to 60-inch sheet mill. After cooling, the blend is calendered to a precise thickness and carefully inspected.

without incurring a penalty in ease of actuation. Lever advantage within the valve permits an extremely light finger pressure.

The toggle-action valve also eliminates the difficulties often encountered in convention alpush-action valves: mis-fires caused by the finger slipping off the button and mis-directed spraying. The toggle-action valve button utilizes an inclined non-skid surface that minimizes chance of mis-firing and

the button shape prevents mis-directed spraying—even in the dark.

Schrader recognizes that its search for dispensing device perfection has achieved successes, but these cannot reduce the need for continued development work. From this research will come better, less complex, more dependable valves to handle a vast array of products—some which hitherto, perhaps, could not be packaged in aerosol form.

N. Y. F. D. C. of A. No. 2064

DIRECTIONS FOR USE

Made Pri

Surface must be free of grease, rust, dirt. Paint should be sprayed in a well-ventilated area. Since spray paint is air-borne, mask off other objects from the over-spray.

WARM the can to room temperature. Submerge in warm water — maximum 90° F. — for 5 minutes.

SHAKE the can back and forth and around ball inside will stir up the paint.

SPRAY with can no further from surface.

MOVE can with short strokes to become tacky.

Practice on another surface before spraying.

Open and shut the fingertip out of the spray.

To avoid possible clogging, clean down and spray a sheen on each job.



If off sprayhead and clogging indicated by arrows in diagram. To use entire contents, sprayhead and rotate material sprays.

CONTENTS ARE FLAMMABLE. Do not start fire or open flame. Do not puncture or incinerate container. Do not store in sun's rays exceeding 120° F. Contents: 16.2 avo

RED

Do not puncture or incinerate. **EXPOSURE TO HEAT MAY CAUSE VIOLENT BURSTING.**

N.Y.F.D. C. of A. No. 2208

DIRECTIONS

Keep away from radiators, stoves, and direct sunlight. Contents should be sprayed at room temperature for best results. Mask or cover areas not to be sprayed. Avoid excessive inhalation and use in well ventilated area.

1. The surface to be painted should be clean and free from dirt, grease, wax, rust, and moisture.

Bronze Varnish Spray is of superlative quality. The **MARINE SPAR GRADE** is completely transparent with exceptional high gloss and can be polished with emulsion or solvent type polishes.

The **SATIN FINISH TYPE** imparts a mellow hand rubbed appearance. Excellent for Antiques, Period Furniture, or wherever a low sheen is desired.

DIRECTIONS

Shake well before using. Apply to clean, dry surface only, at room temperature. If surface has been waxed or oiled, clean with turpentine or mineral spirits. Allow to dry—mask area not to be sprayed.

Hold can 10" to 12" away and apply using old Varnish bubble or or application is too clean with turpentine surfaces may require 2 y hard (overnight dry). lightly between coats cloth dampened with lying next coat. n grain wood, apply ing. d with Lacquer Thinner

SIS

II Purpose

S. 10

kyd Resin.....	8.5%
.....	2.0%
.....	44.5%
.....	45.0%

TOTAL: 100.0%

temperature of 70° F. If chilled, bring to room temperature before using.

When applied properly, spray enamels will dry in three hours, lacquers in twenty minutes.

WARNING: FLAMMABLE — Keep away from, and never spray near, heat, sparks, or open flame. Store away from sun's rays and in temperatures under 130° F. Use with adequate ventilation. Avoid prolonged breathing of spray mist or repeated contact with skin. Contents are under pressure! Do not puncture

LABELING

irregular, inspect orifice for residue and scrape off with fingernail. repellent Freon #12 opening in spray head.

CAUTION: Not to be taken internally.

*Spray-O-Namel is Non-Toxic only after applied and permitted to dry thoroughly.

K-200 GLOSS IVORY

INGREDIENTS

PIGMENT: 12.4%	
RUTILE TITANIUM DIOXIDE.....	98.4%
TINTING COLOR.....	1.6%

AEROSOL PAINT PRODUCTS

By John J. Sciarra*

Part I-Federal Hazardous Substance Labeling Act, and its Importance to Marketers of Aerosol Paint Products.

ON July 12, 1960, Public Law 86-613 became effective, although an extension of time was granted before the law would be enforced in order to allow those affected enough time to comply with these regulations. This law, known as the "Federal Hazardous Substance Labeling Act" is intended to regulate the interstate distribution and sale of packages of hazardous substances intended or suitable for household use. For purposes of this act, a "hazardous substance" is defined as "any substance or mixture of substances which (i) is toxic (ii) is corrosive, (iii) is an irritant, (iv) is a strong sensitizer, (v) is flammable, or (vi) generates pressure

through decomposition, heat, or other means if such substance or mixture of substances may cause substantial personal injury or substantial illness during or as a proximate result of any customary or reasonably foreseeable handling or use, including reasonable foreseeable ingestion by children". However, this act does not apply to economic poisons subject to the Federal Insecticide, Fungicide and Rodenticide Act, nor to the Federal Food, Drug, and Cosmetic Act.

Definitions

While the act clearly defines what is meant by a hazardous substance, the problem of giving

precise definitions for the sub-classifications becomes quite involved. An attempt is made in the law to define some of these terms as follows:

Toxic—Any substance which has the capacity to produce injury or illness to man through ingestion, inhalation, or absorption through any body surface.

Highly toxic—is any substance which falls within any of the following categories: (a) produces death within 14 days in half or more than half of a group of 10 or more laboratory white rats each weighing between 200 and 300 grams, at a single dose of 50 milligrams or less per kilogram of body

*Associate Professor of Pharmaceutical Chemistry, St. John's University, College of Pharmacy, Jamaica 32, New York.

weight when orally administered, (b) when inhaled continuously for a period of one hour or less at an atmospheric concentration of 200 parts per million by volume or less of gas or vapor or 2 milligrams per liter by volume or less of mist or dust, (c) produces death within 14 days in half or more than half of a group of 10 or more rabbits tested in a dosage of 200 milligrams or less per kilogram of body weight, when administered by continuous contact with the bare skin for 24 hours or less. If it is found that available data on human experience with any substance indicate results different from those obtained on animals in the above-named dosages or concentrations, the human data shall take precedence.

Corrosive-any substance which in contact with living tissue will cause destruction of tissue by chemical action, but shall not refer to action on inanimate surfaces.

Irritant-any substance not corrosive as defined above but which on immediate, prolonged or repeated contact with normal living tissue will induce a local inflammatory reaction.

Strong Sensitizer-any substance which will cause on normal living tissue through an allergic or photodynamic process a hypersensitivity which becomes evident on reapplication of the same substance.

Extremely Flammable-any substance which has a flash point at or below 20°F. as determined by the Tagliabue Open Cup Tester, and the term "flammable" shall apply to any substance which has a flash point of above 20° to and including 80°F as determined by the Tagliabue Open Cup Tester; except that the flammability of solids and of the contents of self-pressurized containers shall be determined by methods found to be generally applicable to such materials or containers.

Effective Date

Accordingly, the Commissioner of Food and Drugs has directed that certain provisions of this law become effective on February 1, 1961 since they are adequately defined and ample time has elapsed for the manufacturer to comply with the regulations. These pro-

visions include highly toxic, and extremely flammable, and flammable (except for solids and self-pressurized containers) substances. The animal tests for highly toxic substances and the physical tests for flash points adequately determine the status of the product. In these instances it has been a simple matter for the manufacturer to determine which of his household products fall within these definitions.

Since the other areas of hazardous products has not been defined with exact limits, the commissioner has extended the deadline date for certain provisions of the law to August 1, 1961. These include:

- a) Substances that are "toxic" but not "highly toxic."
- b) Substances that generate pressure through heat, decomposition, or other means.
- c) Corrosive and irritant substances.
- d) Extremely flammable or flammable solids.
- e) Extremely flammable or flammable self-pressurized containers.

It is these provisions of the law which are presenting problems to the manufacturer of household products. Lack of precise limits, adequate tests and facilities for carrying out such tests, as well as interpretation of the results of such test has led to a great deal of confusion.

Labeling Policy

The labeling of hazardous substances with a cautionary label is not new and many manufacturers have been labeling their products with adequate cautionary statements long before the enactment of this law. This law has been said to be a life-saving measure and is designed to alert the homeowner to some of the latent dangers associated with the use or storage of common articles found in the home. Such items as polishes, bleaches, cleaning fluids, paints and solvents, can be dangerous if spilled or accidentally ingested by children or adults. In addition to warning of this danger, adequate directions are also given as to the best measures to overcome the harmful effects of the substance. All too often one is not familiar

with the emergency procedures to be taken in riding the body of a harmful substance. It is this lost time in determining what to do that can mean the difference between life and death. Placing of adequate information on the label may well result in a substantial reduction in the yearly number of deaths attributed to household accidents involving hazardous substances.

The Food and Drug Administration, administrators of this law, are investigating tests and standards which can be used to classify each of the hazards more precisely. For toxic substances, a possible LD50 of 1 gram per kilo may be useful. Present regulations of the United States Drug Administration set substances having a LD50 of 5 grams per kilo as not-so-toxic and require no warnings.

It is difficult to classify "irritant" substances because there is no test animal that is wholly satisfactory for use in predicting effects on human skin. Some of the results may be misleading since they may not include substances which should bear cautionary warnings.

Very little is known about "strong sensitizer" and this area must be fully investigated. According to the FDA a survey, among qualified dermatologists is now underway, the results of which should be of tremendous value in clarifying this area.

Labeling Instructions

Once it is determined that the product represents a potential hazard according to any of the classifications indicated in the law, then it is a simple matter to comply with the law. Accordingly the label of a hazardous substance should bear the following information:

- 1-Name and place of business of the manufacturer, packer, distributor or seller.
- 2-The common or usual name or the chemical name when there is no common or usual name. When there are several substances contributing to the hazardous nature of the product, these must be listed separately unless permission is obtained to use a recognized generic name.

- 3-The signal word, "DANGER" on substances which are extremely flammable, corrosive, or highly toxic.
- 4-The signal word, "WARNING" or "CAUTION" on all other hazardous substances.

5-An affirmative statement of the principle hazard or hazards, such as "Flammable", "Vapor Harmful", "Causes Burns", "Absorbed Through Skin", or similar wording descriptive of the hazard.

6-Precautionary measures describing the action to be followed or avoided, for example, "do not inhale vapors", "do not allow to come in contact with eyes", "do not spill on hands or other parts of the body, "Use with adequate ventilation", etc.

7-Instruction, when necessary or appropriate for first-aid treatment. Unfortunately, even with adequate cautionary labeling, accidents do occur and directions must be given to prevent further injury. Such statements as "Wash immediately with water/or other solvents if necessary", "if ingested, immediately give an emetic (should be named)." In this respect aerosol products present less of a hazard since the delivery rate is controlled and is released slowly. However, due to the spray produced, it is possible that some of the finer particles are inhaled and can be the potential hazard.

8-Instructions for handling and storage of packages which require special care in handling or storage. In this respect, aerosol packages should be adequately labeled. The Chemical Specialties Manufacturers Association suggests the following for aerosol products:

Warning:
Contents Under Pressure
Do Not Puncture
Exposure to prolonged sun-

light or other source of heat may cause bursting
Do Not throw into fire or incinerator.

9-The word "Poison" for any hazardous substance which is defined as "highly toxic".

10-The statement, "Keep out of the reach of children". This is possible one of the most significant statements required by law to be placed on the label. Its purpose is to caution adults on the dangers involved when children handle these products. Each year many thousands of children under

the age of 15 swallow some household product and several hundred pay with their lives. Approximately 90 per cent of all poisoning accidents involve children under age of five years. It should be emphasized that hazardous materials should be kept out of the reach of children.

In the next installment, the author will discuss the makeup of the label along with specific examples of the label of paints and related products. Also to be included will be the suggested labeling regulations for aerosol products as given by the Chemical Specialties Manufacturers Assn.'

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A STRONG LINK in the chain of paint, varnish or lacquer ingredients is the right solvent. That's why so many paint formulators specify APCO solvents—known to the industry more than 35 years for their *uniformity* and dependability in such vital properties as:

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OKLAHOMA CITY, OKLAHOMA

NEWS

Researcher Reports on Japan

"The paint business in Japan, like its general economy, is a highly

dynamic and modern enterprise," reports Donald F. Koenecke, who has just returned from an extended tour of that country and the Philippines.

Mr. Koenecke, who as Research Associate with Enjay Laboratories, Linden, N. J., is in charge of tech-

nical service and development work for Buton resins, estimates Japan's annual coatings production to be about 60 million gallons; the Philippines about 3.5 million gallons per year.

According to Mr. Koenecke, Japan's coating manufacture, essentially based on thermosetting materials, such as polyesters, ureas, melamines, phenolics and epoxies, is an important part of its over-all 1.5-billion-pound synthetic resin business. A substantial amount of these resins is manufactured in Japan. A few materials, such as epoxies and some polyesters, are imported. The Philippines, on the other hand, relies on imports for its resin requirements, except in the case of some alkyd, urea and melamine materials.

In both countries, equipment, plants and laboratories used in protective coatings production are modern, up-to-date and compare favorably with the equipment used in the United States. Both have new and modern buildings housing equipment that is similar to that used in the U. S. and Europe or which may be purchased there.

At 80 per cent of the companies contacted by Mr. Koenecke in the Philippine Islands, prime technical responsibility rests with an American who has Stateside coatings background. By contrast, in Japan, it is a more common policy to employ chemists and engineers who have been educated and trained within the country.

In both countries, technical men are interested in learning about new developments, particularly from the United States. This emphasis on gaining technical information however, is directed at using this information in existing industry rather than in trying to duplicate conditions in other areas.

Mr. Koenecke cites this as an example: In both countries, industrial coatings are usually baked at lower temperatures, such as 250°F., than in the United States. There is no particular interest in trying to raise these curing schedules to match those used here. Instead they are interested in developing better coatings that can be worked into existing schedules.



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NEWS

Program Set for Gordon Research Conferences

The Gordon Research Conferences for 1961 will be held from June 12 to September 1 at Colby Junior College, New London, New Hampshire; New Hampton School, New Hampton, New Hampshire; Kimball Union Academy, Meriden, New Hampshire; and Tilton School, Tilton, New Hampshire.

The conferences were established to stimulate research in universities, research foundations and industrial laboratories. This purpose is achieved by an informal type of meeting consisting of scheduled lectures and discussion groups. Sufficient time is available to stimulate informal discussions among the members of each conference. This type of meeting is a valuable means of disseminating information and ideas to an extent that could not be achieved through the usual channels of publication and presentation at scientific meetings. In addition, scientists in related fields become acquainted, and valuable associations are formed that often result in collaboration and cooperative efforts between different laboratories.

Conferences on Organic Coatings include:

July 17

R. D. Andrews. *Structural Analysis of Polymers by Stress Birefringence Measurements.*

T. L. Smith. *Mechanical Properties of Polymers.*

July 18

E. G. Bell. *Dialysis Techniques for Study of Emulsifier Transport Phenomena in Latex.*

E. R. Moore. *Relations Between Structure and Properties in Water Thinned Alkyd Systems.*

July 19

J. G. Brodnyan. *Mechanism of Emulsion Polymerization and Particle Size Distribution Functions.*

R. F. Fischer. *Cross-Linked Polyesters From Allyl Glycidyl Ether and Maleic Anhydride.*

July 20

F. W. Hobden. *The Mechanism*

of the Formation of Bloom on Paint Surfaces.

J. S. Mackie. *The Weathering of Paints—An Electron Microscopic Investigation.*

July 21

R. J. Fahl. *Optical Properties of Pigmented Films.*

The conferences on organic coatings will be held at Kimball Union Academy, Meriden, N. H.

United Carbon Plans \$3,000,000 Carbon Black Plant

United Carbon Co. announced plans for construction of a \$3,000,000 carbon black plant in Venezuela. The plant will be completed late in 1961 and will have an initial rated capacity of 20 million pounds per year.

Sale-Leaseback Plan Introduced for Paint Firms

A new plan, by which paint companies can sell their existing plant and equipment and immediately lease it back for terms of from three to 12 years, was announced by Nationwide Leasing Co., Chicago.

The plan was designed specifically for firms which have an over-large investment in fixed assets and whose growth, as a result, was being hampered by tight working capital.

Special feature of the plan is that for selected paint firms it will be possible to sell, *for cash*, fully or partially depreciated equipment to Nationwide at greater-than-book-value and lease it back. This is reported to be the first such plan ever developed for the paint industry.



When you start with R-B-H there are no hidden color costs. As far as pigmenting is concerned you have no development expense...you eliminate the guesswork in manufacturing costs...you are reducing waste...you cut overtime.

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Pigment dispersions in nitrocellulose; ethyl cellulose; urea formaldehyde; vinyl and alkyd resins; chlorinated rubber and other plastic binders.

R-B-H is a trademark of Interchemical Corporation.

NEWS

Air Reduction Consolidates Three Chemical Divisions

All activities of Air Reduction Co., Inc., in the industrial chemical field have been consolidated into a single operating unit. The three chemical divisions, Air Reduction Chemical Co., Colton Chemical Co. and National Carbide Co., have been consolidated into a new division known as Air Reduction Chemical and Carbide Co.

Company says the consolidation will improve the company's effectiveness in the industrial chemical field by providing a stronger competitive front, greatly increased marketing strength, and more effective coordination of the company's activities. The sale of polyvinyl acetate emulsions will continue to be handled by the Colton Polymers Dept. Vinyl monomers will be marketed by the Organic Chemicals Dept.



Various posters encourage dealers to clean up, paint up, fix up. This year promises to be a dynamic one for the program.

Northeastern Expands

Northeastern Laboratories, manufacturers of polyurethanes and vinyl acetate emulsions, announced the expansion of its polymer facilities in Huntington, L. I., N. Y.

A new building is being completed to house new 1500 gallon and acrylic vinyl emulsions for interior and exterior paints.

The firm started production in 1957 and has added a new reactor each year as sales increased.

Need Filter Materials NOW? "FILPACO" stocks most items for IMMEDIATE DELIVERY!

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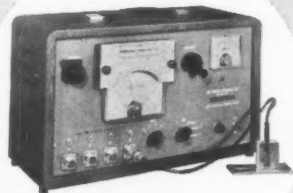
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CALENDAR

June 20-27. 6th Paint Short Course for High School Chemistry Teachers University of Missouri School of Mines and Metallurgy, Rolla, Mo.

June 25-30. Annual Meeting, American Society for Testing Materials, Chalfonte-Haddon Hall, Atlantic City, N. J.

July 17-21. Gordon Research Conferences, Organic Coatings, Kimball Union Academy, Meriden, N. H.

Sept. 3-8. 140th National Meeting, American Chemical Society, Chicago, Ill.

Sept. 11-15. Fall Instrument-Automation Conference and Exhibit and 16th Annual Meeting, Instrument Society of America, Memorial Sports Arena, Los Angeles, Calif.

Oct. 18-20. 23rd Annual National Packaging Forum of the Packaging Institute, Biltmore Hotel, New York City.

Oct. 30-Nov. 1. Seventy-fourth Annual Meeting of the National Paint, Varnish and Lacquer Assn. Statler-Hilton Hotel, Washington, D. C.

Oct. 30-Nov. 1. Fall Meeting of the American Oil Chemists Society, Pick-Congress Hotel, Chicago, Ill.

Oct. 30-Nov. 1. 4th Annual Meeting and Conference of the Canadian Mfrs. Specialties Assn., Royal York Hotel, Toronto, Canada.

Nov. 2-4. Annual Convention of the Federation of Societies for Paint Technology. The Shoreham and Sheraton-Park Hotels, Washington, D. C.

November 26-28. Fourteenth Annual Convention and Trade Show of the Retail Paint & Wallpaper Distributors of America at Cobo Hall, Detroit, Mich.

December 4-6. Chemical Specialties Mfrs. Assn., 48th Annual Meeting, New York City.

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"ANDS" OR "BUTS"



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